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SFUND RECORDS CTR
2118452



TRILLIUM INC.

Data Validation Report

TDD No: 09-04-01-0011
 PAN: 001275.0440.01TA
 Site: El Dorado Hills
 Laboratory: Lab/Cor, Inc.
 Reviewer: Denise A. Shepperd, Trillium, Inc.
 Date: January 28, 2005

I. Case Summary

SAMPLE INFORMATION:

Asbestos Samples:	SRA-R01-100104; SRA-R01-100204; SRA-R01-100304; SRA-R02-100104; SRA-R02-100204; SRA-R02-100304; SRA-R03-100104; SRA-R03-100204; SRA-R03-100304; SRA-R04-100104; SRA-R04-100204; SRA-R04-100304; SRA-R05-100104; SRA-R05-100204; SRA-R05-100304; SRA-R101-100204
Matrix:	16 Air samples
Analysis:	Asbestos by Transmission Electron Microscopy
Collection Dates:	October 1 through 3, 2004
Sample Receipt Date:	October 7, 2004
Analysis Date:	October 13 through November 22, 2004
Analytical Method:	ISO Method 10312

FIELD QC:

Field Trip Blanks (TB):	None
Filter Blanks (FB):	None
Equipment Blanks (EB):	None
Background Samples (BG):	None
Field Duplicates (D1):	Not Identified

TABLES:

- 1A: Analytical Results with Qualifications
- 1B: Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

Two chain of custody (COC) documents were included in the data package and were properly completed. These documents included all of the field samples in the data package, as well as many additional samples.



VALIDATION PARAMETERS AND COMMENTS:

I. Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

II. Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages. The calibration documentation was provided in a single package associated with all of the site sample data packages.

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter included (dated 5/10/04) indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials and included all of the initials documented with this sample set, except "JH." According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types were identified and counts were acceptable according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite and amosite asbestos on 1/27/05. These data were inserted into the QC data package by the validator.

Acceptable instrument calibration was documented in the data package, including screen and camera magnification, camera length and camera constant, spot size, k-factor, beam dose, EDS sensitivity and peak intensity. No documentation of grid opening size was provided. Documentation was provided in the separate proficiency and calibration data package for October through December, 2004, for both of the instruments used for analysis of samples included in this data package. Analyses of the samples in this data set were performed during this time period.

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator. It is recommended however, that supporting data be expanded to include raw data supporting the identification of all asbestos types detected in PE samples and demonstration, wherever possible, of the correct identification (in known reference materials) of all fiber types detected in a field sample set.



III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

Blanks required for this project included Filter Blanks and Field Trip Blanks. No Filter Blanks or Field Trip Blanks were included with this sample set.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as an LCS sample for these data. This requirement was met by the laboratory and reported results for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I).

V. Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures.

The laboratory included all of the QC samples from all of the field sample sets in a separate data package under a separate report number.

The two analysts, JH and TM, not represented in the PE sample analyses included with the data packages for this project did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for both analysts were within the sample-specific acceptance limits.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on 16 field samples reported in the data package, approximately one of each of these QC sample pairs was required. The laboratory compared the primary asbestos structure count for each of the QC sample pairs prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count result. Results for all of the reported QC samples were within the laboratory's calculated limits. A summary of the laboratory QC samples included with this data set are as follows:

Replicate analyses:



- two samples, SRA-R01-100204 and SRA-R04-100104, were analyzed as replicates wherein a different preparation was analyzed by the same analyst;

Duplicate analyses:

- one sample, SRA-R04-100104, was analyzed as a duplicate wherein the same grid openings were recounted by a different analyst;
- one sample, SRA-R01-100204, was analyzed as the third type of duplicate specified by the QAPP, wherein a different analyst analyzes a different preparation.

No samples were analyzed as QC samples for two of the required categories:

- a replicate wherein different grid openings were selected by the same analyst for a second measurement
- a duplicate wherein different grid openings were selected for counting by a different analyst

One sample should have been included for each of these five QC sample categories in order to satisfy the 5% requirements of the QAPP.

An additional type of QC sample not identified by the QAPP was included. Sample SRA-R01-100204 was recounted by the same analyst counting the same grids.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

Actinolite, chrysotile, and tremolite were reported by the laboratory in the field samples. According to the report forms provided in the separate QC package, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses were acceptable. Therefore, based on the documentation provided, fiber and structure identifications for chrysotile and actinolite were determined to be valid as reported. It was assumed that the laboratory correctly identified the other structures that were reported in the field samples.

VII. Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

Results for asbestos categories, fiber density, and detection limits were correctly calculated and accurately reported by the laboratory. Results were verified by the validator using the information included on the reporting forms and the chain of custody records.

VIII. System Performance



This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodologies appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the available documentation.

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05.

Raw data for chrysotile fibers were not included in the data package for review. Raw data documenting fiber identification for the other asbestos types identified in the field samples were present in the data package. Upon request, negatives and EDS for selected samples were received from the laboratory on 1/27/05.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's initials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts, lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

On the printouts for the EDS for some of the field samples the analysis date listed is Jan 1, 1997.

Raw data are an integral part of a complete and defensible data package. Edits made on all data should be performed correctly. Proper editing requires drawing a single line through the incorrect information, adding the correct information, and initialing and dating the changes.

Asbestos structures identified in the field samples included actinolite, chrysotile, and tremolite. Examples of known materials included in the data package in support of the sample analyses included only actinolite, chrysotile, and amosite, identified in the proficiency sample analyses. Based on the data provided for validation, the identification of the other fiber types in a known standard was not documented.

COMMENTS:

- A. For sample SRA-R04-100304, the EDS number recorded on the count sheet as 246 was corrected to 746 to match the raw data for this sample.

ADDITIONAL COMMENTS:

Results for samples in this data set were determined to be valid as reported by the laboratory. No qualifiers were added to the results by the validator. Reported results, analytical sensitivity, and detection limits are considered to be accurate within the bounds of the 95% confidence limits determined for each sample.



The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 10312 “Ambient air - Determination of asbestos fibres - Direct-transfer transmission electron microscopy method,” the document “USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,” 2/94, and Trillium, Inc.’s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.



TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

- U The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.
- L Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.
- J The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.
- R' The data are unusable. The analyte was analyzed for, but the presence or absence of the analyte cannot be verified.
- UJ A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

Table 1A
Analytical Results with Qualifications
Asbestos in Air Samples

C-sample-num	Type	# of structures counted	Concentrations	Units	Analytical sensitivity (AS)	Lower	Upper	Val/Adj Result Conc	Val/Qual	Val/Adj AS	Val Units	Val Comm
SRA-R01-100104	Total Asbestos Structures	8	0.00229	structures/cc	0.000286	3	16				structures/cc	
SRA-R01-100104	Primary Asbestos Structures	8	0.00229	structures/cc	0.000286	3	16				structures/cc	
SRA-R01-100204	Total Asbestos Structures	15	0.00433	structures/cc	0.000289	8	25				structures/cc	
SRA-R01-100204	Primary Asbestos Structures	13	0.00375	structures/cc	0.000289	7	22				structures/cc	
SRA-R01-100304	Total Asbestos Structures	6	0.0018	structures/cc	0.000299	2	13				structures/cc	
SRA-R01-100304	Primary Asbestos Structures	6	0.0018	structures/cc	0.000299	2	13				structures/cc	
SRA-R02-100104	Total Asbestos Structures	13	0.00368	structures/cc	0.000283	7	22				structures/cc	
SRA-R02-100104	Primary Asbestos Structures	13	0.00368	structures/cc	0.000283	7	22				structures/cc	
SRA-R02-100204	Total Asbestos Structures	9	0.00256	structures/cc	0.000285	4	17				structures/cc	
SRA-R02-100204	Primary Asbestos Structures	9	0.00256	structures/cc	0.000285	4	17				structures/cc	
SRA-R02-100304	Primary Asbestos Structures	3	0.000897	structures/cc	0.000299	0	8				structures/cc	
SRA-R02-100304	Total Asbestos Structures	3	0.000897	structures/cc	0.000299	0	8				structures/cc	
SRA-R03-100104	Total Asbestos Structures	7	0.00188	structures/cc	0.000269	3	14				structures/cc	
SRA-R03-100104	Primary Asbestos Structures	7	0.00188	structures/cc	0.000269	3	14				structures/cc	
SRA-R03-100204	Total Asbestos Structures	4	0.00115	structures/cc	0.000287	1	10				structures/cc	
SRA-R03-100204	Primary Asbestos Structures	4	0.00115	structures/cc	0.000287	1	10				structures/cc	
SRA-R03-100304	Total Asbestos Structures	1	0.000281	structures/cc	0.000281	0	5				structures/cc	
SRA-R03-100304	Primary Asbestos Structures	1	0.000281	structures/cc	0.000281	0	5				structures/cc	

Table 1A
Analytical Results with Qualifications
Asbestos in Air Samples

C:sample-num	Type	# of structures counted	Concentrations	Units	Analytical sensitivity (AS)	Lower*	Upper*	Val/Adj Result Conc	Val/Qual	Val/Adj AS	Val Units	Val Comm
SRA-R04-100104	Total Asbestos Structures	13	0.00377	structures/cc	0.00029	7	22				structures/cc	
SRA-R04-100104	Primary Asbestos Structures	13	0.00377	structures/cc	0.00029	7	22				structures/cc	
SRA-R04-100204	Total Asbestos Structures	10	0.00292	structures/cc	0.000292	5	18				structures/cc	
SRA-R04-100204	Primary Asbestos Structures	7	0.00204	structures/cc	0.000292	3	14				structures/cc	
SRA-R04-100304	Total Asbestos Structures	8	0.00234	structures/cc	0.000292	3	16				structures/cc	A
SRA-R04-100304	Primary Asbestos Structures	8	0.00234	structures/cc	0.000292	3	16				structures/cc	A
SRA-R05-100104	Total Asbestos Structures	4	0.00113	structures/cc	0.000283	1	10				structures/cc	
SRA-R05-100104	Primary Asbestos Structures	4	0.00113	structures/cc	0.000283	1	10				structures/cc	
SRA-R05-100204	Primary Asbestos Structures	8	0.00233	structures/cc	0.000291	3	16				structures/cc	
SRA-R05-100204	Total Asbestos Structures	8	0.00233	structures/cc	0.000291	3	16				structures/cc	
SRA-R05-100304	Total Asbestos Structures	3	0.000894	structures/cc	0.000298	0	8				structures/cc	
SRA-R05-100304	Primary Asbestos Structures	3	0.000894	structures/cc	0.000298	0	8				structures/cc	
SRA-R101-100204	Total Asbestos Structures	3	0.000856	structures/cc	0.000285	0	8				structures/cc	
SRA-R101-100204	Primary Asbestos Structures	3	0.000856	structures/cc	0.000285	0	8				structures/cc	

* 95% confidence limits - # of structures counted

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Tuesday, December 07, 2004

Lab/Cor Report Number: **041174R2**

Howard Edwards
Ecology and Environment, Inc.
350 Sansome
Ste 300
San Francisco CA 94104

Phone: 415-981-2811
Fax: 415-981-0801

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS
Project Number: 0440.01CP-0010
Client Reference:
Sample Receipt Date: 10/7/2004

Enclosed please find results for samples submitted to our laboratory. A list of samples and analyses follows:

Lab/Cor Analysis #	Client Sample # and Description	Analysis Type and Notes
<i>Batch #: B4762</i>		
S1-A1	SRA-R01-100104	ISO 10312, direct
S2-A1	SRA-R01-100204	ISO 10312, direct
S3-A1	SRA-R01-100304	ISO 10312, direct
S4-A1	SRA-R02-100104	ISO 10312, direct
S5-A1	SRA-R02-100204	ISO 10312, direct
S6-A1	SRA-R02-100304	ISO 10312, direct
S7-A1	SRA-R03-100104	ISO 10312, direct
S8-A1	SRA-R03-100204	ISO 10312, direct
S9-A1	SRA-R03-100304	ISO 10312, direct
S10-A1	SRA-R04-100104	ISO 10312, direct
S11-A1	SRA-R04-100204	ISO 10312, direct
S12-A1	SRA-R04-100304	ISO 10312, direct
S13-A1	SRA-R05-100104	ISO 10312, direct
S14-A1	SRA-R05-100204	ISO 10312, direct
S15-A1	SRA-R05-100304	ISO 10312, direct
S16-A1	SRA-R101-100204	ISO 10312, direct

ISO 10312, direct Preparation and analysis of the above samples was conducted in accordance with the ISO method 10312 (Direct) for the identification of asbestos. Briefly, the samples were collapsed with acetone, then etched in a low temperature plasma etcher to remove the top surface of the filter and other organics. The samples were carbon coated at high vacuum with a thin layer of carbon, placed on 200 mesh copper grids and allowed to dissolve in acetone until cleared of filter debris.

TEM analysis was performed using a transmission electron microscope equipped with an EDS X ray analyzer. The air samples were analyzed at various approximate screen magnifications of 5,000x for PCM equivalent structures, 10,000x for asbestos structures greater than 5.0 micrometer lengths, and 20,000x for asbestos structures greater than 0.5 micrometer lengths. An accelerating voltage of 100 KV was applied. The sizing of grid openings was performed on the microscope at a magnification of approximately

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550X.

Disclaimer

This test report relates only to the items tested in this report. Interpretation of these results is the sole responsibility of the client.

If further clarification of these results is needed, please call us. Thank you for allowing the staff at Lab/Cor, Inc. the opportunity to provide you with analytical services.

Sincerely,



John Harris, M.P.H.
Laboratory Director

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No. B4762 S1 A1
Client Sample No. SRA-R01-100104
Description
Analysis Date 11/13/2004
Analyst KM

Volume (L) 5457.94
No. of Grid Openings 17
Filter Area (mm²) 385
Area Analyzed (mm²) 0.246
Analytical Sens. (struc/cc) 0.000286
Detection Limit. (struc/cc) 0.000856

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	32.5	0.00229	0.000989 - 0.00451	8
Total Asbestos Structures	32.5	0.00229	0.000989 - 0.00451	8
Asbestos Structures > 5um	28.4	0.00200	0.000806 - 0.00413	7
Asbestos Fibers and Bundles > 5um	16.2	0.00115	0.000312 - 0.00293	4
PCM Equivalent Fibers-US	12.2	0.000859	0.00 - 0.00222	3
PCM Equivalent Structures-US	12.2	0.000859	0.00 - 0.00222	3
PROTOCOL ASB STRUCS 5-10	4.1	0.000286	0.00 - 0.00136	1
PROTOCOL ASB STRUCS >10	0.0	<0.000856	0.00 - 0.000856	0
PROTOCOL ASB STRUCS TOTAL	4.1	0.000286	0.00 - 0.00136	1
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000856	0.00 - 0.000856	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000856	0.00 - 0.000856	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000856	0.00 - 0.000856	0
PROTOCOL AMPH STRUCS 5-10	4.1	0.000286	0.00 - 0.00136	1
PROTOCOL AMPH STRUCS >10	0.0	<0.000856	0.00 - 0.000856	0
PROTOCOL AMPH STRUCS TOTAL	4.1	0.000286	0.00 - 0.00136	1
AHERA-like Total Structures 3:1	32.5	0.00229	0.000989 - 0.00451	8
AHERA-like Asb Strucs >5 and 3:1	28.4	0.00200	0.000806 - 0.00413	7
AHERA-like Asb Strucs 5 - 10 and 3:1	16.2	0.00115	0.000312 - 0.00293	4
AHERA-like Asb Strucs >10 and 3:1	12.2	0.000859	0.00 - 0.00222	3
Total Other Amphibole Strucs 3:1	0.0	<0.000856	0.00 - 0.000856	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000856	0.00 - 0.000856	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000856	0.00 - 0.000856	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000856	0.00 - 0.000856	0

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Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S2 A1	Volume (L)	6577.89
Client Sample No.	SRA-R01-100204	No. of Grid Openings	14
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.203
Analyst	KM	Analytical Sens. (struc/cc)	0.000289
		Detection Limit. (struc/cc)	0.000863

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	64.1	0.00375	0.00200 - 0.00641	13
Total Asbestos Structures	73.9	0.00433	0.00242 - 0.00714	15
Asbestos Structures > 5um	14.8	0.000866	0.00 - 0.00224	3
Asbestos Fibers and Bundles > 5um	9.9	0.000577	0.00 - 0.00182	2
PCM Equivalent Fibers-US	9.9	0.000577	0.00 - 0.00182	2
PCM Equivalent Structures-US	4.9	0.000289	0.00 - 0.00137	1
PROTOCOL ASB STRUCS 5-10	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL ASB STRUCS >10	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000863	0.00 - 0.000863	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000863	0.00 - 0.000863	0
AHERA-like Total Structures 3:1	64.1	0.00375	0.00200 - 0.00641	13
AHERA-like Asb Strucs >5 and 3:1	14.8	0.000866	0.00 - 0.00224	3
AHERA-like Asb Strucs 5 - 10 and 3:1	0.0	<0.000863	0.00 - 0.000863	0
AHERA-like Asb Strucs >10 and 3:1	14.8	0.000866	0.00 - 0.00224	3
Total Other Amphibole Strucs 3:1	0.0	<0.000863	0.00 - 0.000863	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000863	0.00 - 0.000863	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000863	0.00 - 0.000863	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000863	0.00 - 0.000863	0

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Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S3 A1	Volume (L)	6339.84
Client Sample No.	SRA-R01-100304	No. of Grid Openings	14
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.203
Analyst	KM	Analytical Sens. (struc/cc)	0.000299
		Detection Limit. (struc/cc)	0.000895

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	29.6	0.00180	0.000659 - 0.00391	6
Total Asbestos Structures	29.6	0.00180	0.000659 - 0.00391	6
Asbestos Structures > 5um	0.0	<0.000895	0.00 - 0.000895	0
Asbestos Fibers and Bundles > 5um	0.0	<0.000895	0.00 - 0.000895	0
PCM Equivalent Fibers-US	0.0	<0.000895	0.00 - 0.000895	0
PCM Equivalent Structures-US	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL ASB STRUCS 5-10	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL ASB STRUCS >10	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000895	0.00 - 0.000895	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000895	0.00 - 0.000895	0
AHERA-like Total Structures 3:1	29.6	0.00180	0.000659 - 0.00391	6
AHERA-like Asb Strucs >5 and 3:1	0.0	<0.000895	0.00 - 0.000895	0
AHERA-like Asb Strucs 5 - 10 and 3:1	0.0	<0.000895	0.00 - 0.000895	0
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000895	0.00 - 0.000895	0
Total Other Amphibole Strucs 3:1	0.0	<0.000895	0.00 - 0.000895	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000895	0.00 - 0.000895	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000895	0.00 - 0.000895	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000895	0.00 - 0.000895	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S4 A1	Volume (L)	5871.9
Client Sample No.	SRA-R02-100104	No. of Grid Openings	16
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.232
Analyst	KM	Analytical Sens. (struc/cc)	0.000283
		Detection Limit. (struc/cc)	0.000846

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	56.1	0.00368	0.00196 - 0.00629	13
Total Asbestos Structures	56.1	0.00368	0.00196 - 0.00629	13
Asbestos Structures > 5um	30.2	0.00198	0.000796 - 0.00408	7
Asbestos Fibers and Bundles > 5um	30.2	0.00198	0.000796 - 0.00408	7
PCM Equivalent Fibers-US	30.2	0.00198	0.000796 - 0.00408	7
PCM Equivalent Structures-US	30.2	0.00198	0.000796 - 0.00408	7
PROTOCOL ASB STRUCS 5-10	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL ASB STRUCS >10	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000846	0.00 - 0.000846	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000846	0.00 - 0.000846	0
AHERA-like Total Structures 3:1	56.1	0.00368	0.00196 - 0.00629	13
AHERA-like Asb Strucs >5 and 3:1	30.2	0.00198	0.000796 - 0.00408	7
AHERA-like Asb Strucs 5 - 10 and 3:1	21.6	0.00141	0.000459 - 0.00330	5
AHERA-like Asb Strucs >10 and 3:1	8.6	0.000566	0.00 - 0.00178	2
Total Other Amphibole Strucs 3:1	0.0	<0.000846	0.00 - 0.000846	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000846	0.00 - 0.000846	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000846	0.00 - 0.000846	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000846	0.00 - 0.000846	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S5 A1	Volume (L)	6661.15
Client Sample No.	SRA-R02-100204	No. of Grid Openings	14
Description		Filter Area (mm²)	385
Analysis Date	11/14/2004	Area Analyzed (mm²)	0.203
Analyst	TM	Analytical Sens. (struc/cc)	0.000285
		Detection Limit. (struc/cc)	0.000852

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	44.4	0.00256	0.00117 - 0.00487	9
Total Asbestos Structures	44.4	0.00256	0.00117 - 0.00487	9
Asbestos Structures > 5um	14.8	0.000855	0.00 - 0.00221	3
Asbestos Fibers and Bundles > 5um	14.8	0.000855	0.00 - 0.00221	3
PCM Equivalent Fibers-US	14.8	0.000855	0.00 - 0.00221	3
PCM Equivalent Structures-US	9.9	0.000570	0.00 - 0.00179	2
PROTOCOL ASB STRUCS 5-10	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL ASB STRUCS >10	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000852	0.00 - 0.000852	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000852	0.00 - 0.000852	0
AHERA-like Total Structures 3:1	44.4	0.00256	0.00117 - 0.00487	9
AHERA-like Asb Strucs >5 and 3:1	14.8	0.000855	0.00 - 0.00221	3
AHERA-like Asb Strucs 5 - 10 and 3:1	4.9	0.000285	0.00 - 0.00135	1
AHERA-like Asb Strucs >10 and 3:1	9.9	0.000570	0.00 - 0.00179	2
Total Other Amphibole Strucs 3:1	0.0	<0.000852	0.00 - 0.000852	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000852	0.00 - 0.000852	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000852	0.00 - 0.000852	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000852	0.00 - 0.000852	0

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S6 A1	Volume (L)	6350.89
Client Sample No.	SRA-R02-100304	No. of Grid Openings	14
Description		Filter Area (mm ²)	385
Analysis Date	11/14/2004	Area Analyzed (mm ²)	0.203
Analyst	TM	Analytical Sens. (struc/cc)	0.000299
		Detection Limit. (struc/cc)	0.000894

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	14.8	0.000897	0.00 - 0.00232	3
Total Asbestos Structures	14.8	0.000897	0.00 - 0.00232	3
Asbestos Structures > 5um	4.9	0.000299	0.00 - 0.00142	1
Asbestos Fibers and Bundles > 5um	0.0	<0.000894	0.00 - 0.000894	0
PCM Equivalent Fibers-US	0.0	<0.000894	0.00 - 0.000894	0
PCM Equivalent Structures-US	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL ASB STRUCS 5-10	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL ASB STRUCS >10	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000894	0.00 - 0.000894	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000894	0.00 - 0.000894	0
AHERA-like Total Structures 3:1	14.8	0.000897	0.00 - 0.00232	3
AHERA-like Asb Strucs >5 and 3:1	4.9	0.000299	0.00 - 0.00142	1
AHERA-like Asb Strucs 5 - 10 and 3:1	4.9	0.000299	0.00 - 0.00142	1
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000894	0.00 - 0.000894	0
Total Other Amphibole Strucs 3:1	0.0	<0.000894	0.00 - 0.000894	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000894	0.00 - 0.000894	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000894	0.00 - 0.000894	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000894	0.00 - 0.000894	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S7 A1	Volume (L)	5485.48
Client Sample No.	SRA-R03-100104	No. of Grid Openings	18
Description		Filter Area (mm ²)	385
Analysis Date	11/14/2004	Area Analyzed (mm ²)	0.261
Analyst	JH	Analytical Sens. (struc/cc)	0.000269
		Detection Limit. (struc/cc)	0.000805

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	26.8	0.00188	0.000757 - 0.00388	7
Total Asbestos Structures	26.8	0.00188	0.000757 - 0.00388	7
Asbestos Structures > 5um	3.8	0.000269	0.00 - 0.00128	1
Asbestos Fibers and Bundles > 5um	3.8	0.000269	0.00 - 0.00128	1
PCM Equivalent Fibers-US	3.8	0.000269	0.00 - 0.00128	1
PCM Equivalent Structures-US	3.8	0.000269	0.00 - 0.00128	1
PROTOCOL ASB STRUCS 5-10	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL ASB STRUCS >10	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000805	0.00 - 0.000805	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000805	0.00 - 0.000805	0
AHERA-like Total Structures 3:1	26.8	0.00188	0.000757 - 0.00388	7
AHERA-like Asb Strucs >5 and 3:1	3.8	0.000269	0.00 - 0.00128	1
AHERA-like Asb Strucs 5 - 10 and 3:1	3.8	0.000269	0.00 - 0.00128	1
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000805	0.00 - 0.000805	0
Total Other Amphibole Strucs 3:1	0.0	<0.000805	0.00 - 0.000805	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000805	0.00 - 0.000805	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000805	0.00 - 0.000805	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000805	0.00 - 0.000805	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S8 A1	Volume (L)	6173.19
Client Sample No.	SRA-R03-100204	No. of Grid Openings	15
Description		Filter Area (mm²)	385
Analysis Date	11/15/2004	Area Analyzed (mm²)	0.217
Analyst	KM	Analytical Sens. (struc/cc)	0.000287
		Detection Limit. (struc/cc)	0.000858

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	18.4	0.00115	0.000313 - 0.00294	4
Total Asbestos Structures	18.4	0.00115	0.000313 - 0.00294	4
Asbestos Structures > 5um	9.2	0.000574	0.00 - 0.00181	2
Asbestos Fibers and Bundles > 5um	9.2	0.000574	0.00 - 0.00181	2
PCM Equivalent Fibers-US	4.6	0.000287	0.00 - 0.00136	1
PCM Equivalent Structures-US	4.6	0.000287	0.00 - 0.00136	1
PROTOCOL ASB STRUCS 5-10	4.6	0.000287	0.00 - 0.00136	1
PROTOCOL ASB STRUCS >10	0.0	<0.000858	0.00 - 0.000858	0
PROTOCOL ASB STRUCS TOTAL	4.6	0.000287	0.00 - 0.00136	1
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000858	0.00 - 0.000858	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000858	0.00 - 0.000858	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000858	0.00 - 0.000858	0
PROTOCOL AMPH STRUCS 5-10	4.6	0.000287	0.00 - 0.00136	1
PROTOCOL AMPH STRUCS >10	0.0	<0.000858	0.00 - 0.000858	0
PROTOCOL AMPH STRUCS TOTAL	4.6	0.000287	0.00 - 0.00136	1
AHERA-like Total Structures 3:1	18.4	0.00115	0.000313 - 0.00294	4
AHERA-like Asb Strucs >5 and 3:1	9.2	0.000574	0.00 - 0.00181	2
AHERA-like Asb Strucs 5 - 10 and 3:1	4.6	0.000287	0.00 - 0.00136	1
AHERA-like Asb Strucs >10 and 3:1	4.6	0.000287	0.00 - 0.00136	1
Total Other Amphibole Strucs 3:1	0.0	<0.000858	0.00 - 0.000858	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000858	0.00 - 0.000858	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000858	0.00 - 0.000858	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000858	0.00 - 0.000858	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S9 A1	Volume (L)	6305.74
Client Sample No.	SRA-R03-100304	No. of Grid Openings	15
Description		Filter Area (mm²)	385
Analysis Date	11/15/2004	Area Analyzed (mm²)	0.217
Analyst	KM	Analytical Sens. (struc/cc)	0.000281
		Detection Limit. (struc/cc)	0.000840

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	4.6	0.000281	0.00 - 0.00133	1
Total Asbestos Structures	4.6	0.000281	0.00 - 0.00133	1
Asbestos Structures > 5um	0.0	<0.000840	0.00 - 0.000840	0
Asbestos Fibers and Bundles > 5um	0.0	<0.000840	0.00 - 0.000840	0
PCM Equivalent Fibers-US	0.0	<0.000840	0.00 - 0.000840	0
PCM Equivalent Structures-US	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL ASB STRUCS 5-10	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL ASB STRUCS >10	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000840	0.00 - 0.000840	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000840	0.00 - 0.000840	0
AHERA-like Total Structures 3:1	4.6	0.000281	0.00 - 0.00133	1
AHERA-like Asb Strucs >5 and 3:1	0.0	<0.000840	0.00 - 0.000840	0
AHERA-like Asb Struca 5 - 10 and 3:1	0.0	<0.000840	0.00 - 0.000840	0
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000840	0.00 - 0.000840	0
Total Other Amphibole Strucs 3:1	0.0	<0.000840	0.00 - 0.000840	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000840	0.00 - 0.000840	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000840	0.00 - 0.000840	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000840	0.00 - 0.000840	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S10 A1	Volume (L)	4824
Client Sample No.	SRA-R04-100104	No. of Grid Openings	19
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.275
Analyst	JH	Analytical Sens. (struc/cc)	0.000290
		Detection Limit. (struc/cc)	0.000867

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	47.2	0.00377	0.00201 - 0.00644	13
Total Asbestos Structures	47.2	0.00377	0.00201 - 0.00644	13
Asbestos Structures > 5um	14.5	0.00116	0.000316 - 0.00297	4
Asbestos Fibers and Bundles > 5um	14.5	0.00116	0.000316 - 0.00297	4
PCM Equivalent Fibers-US	14.5	0.00116	0.000316 - 0.00297	4
PCM Equivalent Structures-US	10.9	0.000870	0.00 - 0.00225	3
PROTOCOL ASB STRUCS 5-10	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL ASB STRUCS >10	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000867	0.00 - 0.000867	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000867	0.00 - 0.000867	0
AHERA-like Total Structures 3:1	47.2	0.00377	0.00201 - 0.00644	13
AHERA-like Asb Strucs >5 and 3:1	14.5	0.00116	0.000316 - 0.00297	4
AHERA-like Asb Strucs 5 - 10 and 3:1	14.5	0.00116	0.000316 - 0.00297	4
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000867	0.00 - 0.000867	0
Total Other Amphibole Strucs 3:1	0.0	<0.000867	0.00 - 0.000867	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000867	0.00 - 0.000867	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000867	0.00 - 0.000867	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000867	0.00 - 0.000867	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S11 A1	Volume (L)	6074.18
Client Sample No.	SRA-R04-100204	No. of Grid Openings	15
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.217
Analyst	JH	Analytical Sens. (struc/cc)	0.000292
		Detection Limit. (struc/cc)	0.000872

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	32.2	0.00204	0.000821 - 0.00421	7
Total Asbestos Structures	46.0	0.00292	0.00140 - 0.00536	10
Asbestos Structures > 5um	18.4	0.00117	0.000318 - 0.00299	4
Asbestos Fibers and Bundles > 5um	13.8	0.000875	0.00 - 0.00226	3
PCM Equivalent Fibers-US	13.8	0.000875	0.00 - 0.00226	3
PCM Equivalent Structures-US	9.2	0.000583	0.00 - 0.00184	2
PROTOCOL ASB STRUCS 5-10	9.2	0.000583	0.00 - 0.00184	2
PROTOCOL ASB STRUCS >10	0.0	<0.000872	0.00 - 0.000872	0
PROTOCOL ASB STRUCS TOTAL	9.2	0.000583	0.00 - 0.00184	2
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000872	0.00 - 0.000872	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000872	0.00 - 0.000872	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000872	0.00 - 0.000872	0
PROTOCOL AMPH STRUCS 5-10	9.2	0.000583	0.00 - 0.00184	2
PROTOCOL AMPH STRUCS >10	0.0	<0.000872	0.00 - 0.000872	0
PROTOCOL AMPH STRUCS TOTAL	9.2	0.000583	0.00 - 0.00184	2
AHERA-like Total Structures 3:1	32.2	0.00204	0.000821 - 0.00421	7
AHERA-like Asb Strucs >5 and 3:1	18.4	0.00117	0.000318 - 0.00299	4
AHERA-like Asb Strucs 5 - 10 and 3:1	18.4	0.00117	0.000318 - 0.00299	4
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000872	0.00 - 0.000872	0
Total Other Amphibole Strucs 3:1	0.0	<0.000872	0.00 - 0.000872	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000872	0.00 - 0.000872	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000872	0.00 - 0.000872	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000872	0.00 - 0.000872	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S12 A1	Volume (L)	5687.88
Client Sample No.	SRA-R04-100304	No. of Grid Openings	16
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.232
Analyst	JH	Analytical Sens. (struc/cc)	0.000292
		Detection Limit. (struc/cc)	0.000873

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	34.5	0.00234	0.00101 - 0.00460	8
Total Asbestos Structures	34.5	0.00234	0.00101 - 0.00460	8
Asbestos Structures > 5um	12.9	0.000876	0.00 - 0.00226	3
Asbestos Fibers and Bundles > 5um	12.9	0.000876	0.00 - 0.00226	3
PCM Equivalent Fibers-US	8.6	0.000584	0.00 - 0.00184	2
PCM Equivalent Structures-US	8.6	0.000584	0.00 - 0.00184	2
PROTOCOL ASB STRUCS 5-10	4.3	0.000292	0.00 - 0.00138	1
PROTOCOL ASB STRUCS >10	0.0	<0.000873	0.00 - 0.000873	0
PROTOCOL ASB STRUCS TOTAL	4.3	0.000292	0.00 - 0.00138	1
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000873	0.00 - 0.000873	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000873	0.00 - 0.000873	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000873	0.00 - 0.000873	0
PROTOCOL AMPH STRUCS 5-10	4.3	0.000292	0.00 - 0.00138	1
PROTOCOL AMPH STRUCS >10	0.0	<0.000873	0.00 - 0.000873	0
PROTOCOL AMPH STRUCS TOTAL	4.3	0.000292	0.00 - 0.00138	1
AHERA-like Total Structures 3:1	34.5	0.00234	0.00101 - 0.00460	8
AHERA-like Asb Strucs >5 and 3:1	12.9	0.000876	0.00 - 0.00226	3
AHERA-like Asb Strucs 5 - 10 and 3:1	4.3	0.000292	0.00 - 0.00138	1
AHERA-like Asb Strucs >10 and 3:1	8.6	0.000584	0.00 - 0.00184	2
Total Other Amphibole Strucs 3:1	0.0	<0.000873	0.00 - 0.000873	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000873	0.00 - 0.000873	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000873	0.00 - 0.000873	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000873	0.00 - 0.000873	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S13 A1	Volume (L)	5863.36
Client Sample No.	SRA-R05-100104	No. of Grid Openings	16
Description		Filter Area (mm ²)	385
Analysis Date	11/13/2004	Area Analyzed (mm ²)	0.232
Analyst	JH	Analytical Sens. (struc/cc)	0.000283
		Detection Limit. (struc/cc)	0.000847

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	17.3	0.00113	0.000309 - 0.00290	4
Total Asbestos Structures	17.3	0.00113	0.000309 - 0.00290	4
Asbestos Structures > 5um	17.3	0.00113	0.000309 - 0.00290	4
Asbestos Fibers and Bundles > 5um	17.3	0.00113	0.000309 - 0.00290	4
PCM Equivalent Fibers-US	17.3	0.00113	0.000309 - 0.00290	4
PCM Equivalent Structures-US	17.3	0.00113	0.000309 - 0.00290	4
PROTOCOL ASB STRUCS 5-10	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL ASB STRUCS >10	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000847	0.00 - 0.000847	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000847	0.00 - 0.000847	0
AHERA-like Total Structures 3:1	17.3	0.00113	0.000309 - 0.00290	4
AHERA-like Asb Strucs >5 and 3:1	17.3	0.00113	0.000309 - 0.00290	4
AHERA-like Asb Strucs 5 - 10 and 3:1	8.6	0.000566	0.00 - 0.00178	2
AHERA-like Asb Strucs >10 and 3:1	8.6	0.000566	0.00 - 0.00178	2
Total Other Amphibole Strucs 3:1	0.0	<0.000847	0.00 - 0.000847	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000847	0.00 - 0.000847	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000847	0.00 - 0.000847	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000847	0.00 - 0.000847	0

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S14 A1	Volume (L)	6083.62
Client Sample No.	SRA-R05-100204	No. of Grid Openings	15
Description		Filter Area (mm ²)	385
Analysis Date	11/14/2004	Area Analyzed (mm ²)	0.217
Analyst	JH	Analytical Sens. (struc/cc)	0.000291
		Detection Limit. (struc/cc)	0.000871

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	36.8	0.00233	0.00101 - 0.00459	8
Total Asbestos Structures	36.8	0.00233	0.00101 - 0.00459	8
Asbestos Structures > 5um	18.4	0.00116	0.000317 - 0.00298	4
Asbestos Fibers and Bundles > 5um	9.2	0.000582	0.00 - 0.00183	2
PCM Equivalent Fibers-US	13.8	0.000873	0.00 - 0.00226	3
PCM Equivalent Structures-US	9.2	0.000582	0.00 - 0.00183	2
PROTOCOL ASB STRUCS 5-10	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL ASB STRUCS >10	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000871	0.00 - 0.000871	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000871	0.00 - 0.000871	0
AHERA-like Total Structures 3:1	36.8	0.00233	0.00101 - 0.00459	8
AHERA-like Asb Strucs >5 and 3:1	18.4	0.00116	0.000317 - 0.00298	4
AHERA-like Asb Strucs 5 - 10 and 3:1	18.4	0.00116	0.000317 - 0.00298	4
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000871	0.00 - 0.000871	0
Total Other Amphibole Strucs 3:1	0.0	<0.000871	0.00 - 0.000871	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000871	0.00 - 0.000871	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000871	0.00 - 0.000871	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000871	0.00 - 0.000871	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S15 A1	Volume (L)	6369.3
Client Sample No.	SRA-R05-100304	No. of Grid Openings	14
Description		Filter Area (mm ²)	385
Analysis Date	11/14/2004	Area Analyzed (mm ²)	0.203
Analyst	JH	Analytical Sens. (struc/cc)	0.000298
		Detection Limit. (struc/cc)	0.000891

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	14.8	0.000894	0.00 - 0.00231	3
Total Asbestos Structures	14.8	0.000894	0.00 - 0.00231	3
Asbestos Structures > 5um	0.0	<0.000891	0.00 - 0.000891	0
Asbestos Fibers and Bundles > 5um	0.0	<0.000891	0.00 - 0.000891	0
PCM Equivalent Fibers-US	0.0	<0.000891	0.00 - 0.000891	0
PCM Equivalent Structures-US	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL ASB STRUCS 5-10	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL ASB STRUCS >10	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000891	0.00 - 0.000891	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000891	0.00 - 0.000891	0
AHERA-like Total Structures 3:1	14.8	0.000894	0.00 - 0.00231	3
AHERA-like Asb Strucs >5 and 3:1	0.0	<0.000891	0.00 - 0.000891	0
AHERA-like Asb Strucs 5 - 10 and 3:1	0.0	<0.000891	0.00 - 0.000891	0
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000891	0.00 - 0.000891	0
Total Other Amphibole Strucs 3:1	0.0	<0.000891	0.00 - 0.000891	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000891	0.00 - 0.000891	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000891	0.00 - 0.000891	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000891	0.00 - 0.000891	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

ANALYSIS DETAIL

Lab/Cor Sample No.	B4762 S16 A1	Volume (L)	6655.05
Client Sample No.	SRA-R101-100204	No. of Grid Openings	14
Description		Filter Area (mm ²)	385
Analysis Date	11/14/2004	Area Analyzed (mm ²)	0.203
Analyst	JH	Analytical Sens. (struc/cc)	0.000285
		Detection Limit. (struc/cc)	0.000853

Structure Type	Filter Density (s/mm ²)	Concen-tration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	14.8	0.000856	0.00 - 0.00221	3
Total Asbestos Structures	14.8	0.000856	0.00 - 0.00221	3
Asbestos Structures > 5um	4.9	0.000285	0.00 - 0.00135	1
Asbestos Fibers and Bundles > 5um	4.9	0.000285	0.00 - 0.00135	1
PCM Equivalent Fibers-US	0.0	<0.000853	0.00 - 0.000853	0
PCM Equivalent Structures-US	0.0	<0.000853	0.00 - 0.000853	0
PROTOCOL ASB STRUCS 5-10	4.9	0.000285	0.00 - 0.00135	1
PROTOCOL ASB STRUCS >10	0.0	<0.000853	0.00 - 0.000853	0
PROTOCOL ASB STRUCS TOTAL	4.9	0.000285	0.00 - 0.00135	1
PROTOCOL CHRYS STRUCS 5-10	4.9	0.000285	0.00 - 0.00135	1
PROTOCOL CHRYS STRUCS >10	0.0	<0.000853	0.00 - 0.000853	0
PROTOCOL CHRYS STRUCS TOTAL	4.9	0.000285	0.00 - 0.00135	1
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000853	0.00 - 0.000853	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000853	0.00 - 0.000853	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000853	0.00 - 0.000853	0
AHERA-like Total Structures 3:1	14.8	0.000856	0.00 - 0.00221	3
AHERA-like Asb Strucs >5 and 3:1	4.9	0.000285	0.00 - 0.00135	1
AHERA-like Asb Strucs 5 - 10 and 3:1	4.9	0.000285	0.00 - 0.00135	1
AHERA-like Asb Strucs >10 and 3:1	0.0	<0.000853	0.00 - 0.000853	0
Total Other Amphibole Strucs 3:1	0.0	<0.000853	0.00 - 0.000853	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000853	0.00 - 0.000853	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000853	0.00 - 0.000853	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000853	0.00 - 0.000853	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R01-100104

Lab/Cor Sample No.: B4762 S1 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B42	ADQ	1		MD1-0	5.5	3.8	1.4			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	1	B42	ADQ		1	MF	1.5	0.25	6.0			Mg, Al, Si, Ca, Fe Actinolite	
A	2	B12	AQ	2	2	F	16	2.5	6.4			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	3	C12	ADQ	3		MD1-1	10	5	2.0			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	C12	ADQ		3	MF	8	0.22	36			Mg, Al, Si, Ca, Fe Actinolite	AFB>5, PSAS 5-10, PSAS TOT, PSAM 5-10, PSAM TOT
A	4	B14	ADQ	4	4	F	12	1.8	6.7			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	4	B14	AQ	5	5	F	9.3	1.8	5.2			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	4	B14	AQ	6	6	F	4.5	0.7	6.4			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	5	C4				NSD							
A	6	C34				NSD							
A	7	A31				NSD							
A	8	A1	AQ	7		MD1-0	14	8	1.8			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	8	A1	AQ		7	MF	4	1	4.0			Mg, Al, Si, Ca, Fe Actinolite	
A	9	D21				NSD							
B	10	B33				NSD							
B	11	B3	AZQ	8		MD1-0	8	4	2.0			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	11	B3	AZQ		8	MF	2.5	0.8	3.1	5475	15353	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [3 -1 4] - KM	
B	12	C23				NSD							
B	13	B21				NSD							
B	14	C1				NSD							
B	15	C31				NSD							
B	16	A21				NSD							
B	17	A1				NSD							

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R01-100204

Lab/Cor Sample No.: B4762 S2 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B22			NSD								
A	2	C2	ADQ	1	1	F	12	1.4	8.6			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	3	C32	AZQ	2	2	F	1.9	0.6	3.2	5476	15354	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [3-1 0] - KM	TAS_AHRA
A	4	A41	CD	3		MD1-0	2	0.4	5.0			Chrysotile tilts into grid bar	TAS_AHRA
A	4	A41	CD		3	MF	0.8	0.1	8.0			Mg, Si Chrysotile	
A	4	A41	ADQ	4	4	F	3	0.22	14			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	5	A21	AZQ	5		MD1-1	16	10	1.6	5478	15355	Mg, Al, Si, Ca, Fe Tremolite Zone Axis [3-1 2] - KM	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	5	A21	AZQ		5	MF	8	1.2	6.7			Mg, Al, Si, Ca, Fe Tremolite	AFB>5, PCMEF-US
A	6	D11	ADQ	6	6	F	2.8	0.4	7.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	7	D41	CDQ	7		MD1-0	4	1.2	3.3			Chrysotile	TAS_AHRA
A	7	D41	CDQ		7	MF	1.2	0.08	15	5479	15356	Mg, Si Chrysotile Verified -KM	
B	8	B34			NSD								
B	9	B14			NSD								
B	10	C4	CMQ	8		MD3-0	2	1	2.0			Chrysotile	TAS_AHRA
B	10	C4	CMQ		8	MF	1.2	0.1	12			Chrysotile	
B	10	C4	CMQ		9	MF	1	0.1	10			Chrysotile	
B	10	C4	CMQ		10	MF	0.8	0.1	8.0			Chrysotile	
B	11	C24			NSD								
B	12	D1	AQ	9	11	F	3	0.5	6.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	13	D21	AQ	10		MD1-0	4.5	3.5	1.3			Actinolite	TAS_AHRA
B	13	D21	AQ		12	MF	1.3	0.35	3.7			Mg, Al, Si, Ca, Fe Actinolite	
B	13	D21	AQ	11		MD1-0	13	6	2.2			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	13	D21	AQ		13	MF	3	0.2	15			Mg, Al, Si, Ca, Fe Actinolite	
B	13	D21	AQ	12	14	F	3.5	0.38	9.2			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	14	D41	AQ	13	15	F	2	0.4	5.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R01-100304

Lab/Cor Sample No.: B4762 S3 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B44			NSD								
A	2	B4			NSD								
A	3	C24			NSD								
A	4	B42	AZQ	1	1	F	3	0.38	7.9	5481	15358	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [5 3 2] - KM	TAS_AHRA
A	5	B12			NSD								
A	6	C12	ADQ	2	2	F	3	0.7	4.3			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	6	C12	AQ	3	3	F	1.5	0.5	3.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	7	C42	AQ	4	4	F	2	0.2	10			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	7	C42	CDQ	5		MD1-0	3	1.5	2.0			Chrysotile	TAS_AHRA
A	7	C42	CDQ		5	MF	1.8	0.1	18	5482	15359	Mg, Si Chrysotile Verified - KM	
B	8	B41			NSD								
B	9	B11			NSD								
B	10	C11	CD	6		MD1-0	3.8	1.8	2.1			Chrysotile	TAS_AHRA
B	10	C11	CD		6	MF	3.8	0.08	48			Chrysotile	
B	11	C41			NSD								
B	12	A1			NSD								
B	13	D11			NSD								
B	14	D31			NSD								

Lab/Cor, Inc.
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Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R02-100104

Lab/Cor Sample No.: B4762 S4 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B32				NSD							
A	2	B12	AQ	1	1	F	13	2	6.5			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	2	B12	AQ	2	2	F	6	2	3.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	B12	AQ	3	3	F	5.5	1	5.5			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	C2	AQ	4	4	F	13	1.5	8.7			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	4	C22	AZQ	5	5	F	5	1.6	3.1	5484	15361	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [4 1 2] - KM	TAS_AHRA
A	5	A41	AQ	6	6	F	4.5	0.9	5.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	5	A41	AQ	7	7	F	6.8	1.8	3.8			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	6	A21	CDQ	8	8	F	1.6	0.18	8.9	5485	15362	Mg, Si Chrysotile Verified - KM	TAS_AHRA
A	7	A1	CD	9		MD1-0	1.8	1.2	1.5			Chrysotile	TAS_AHRA
A	7	A1	CD		9	MF	1.6	0.08	20			Mg, Si Chrysotile	
A	8	D11	AQ	10	10	F	4.5	1	4.5			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	9	B44				NSD							
B	10	B24				NSD							
B	11	B4				NSD							
B	12	C14	AQ	11	11	F	6.75	1.5	4.5			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	13	C34	AQ	12	12	B	9.75	1.45	6.7			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	14	C43				NSD							
B	15	C23	CDQ	13	13	B	2.5	0.3	8.3			Mg, Al, Fe Chrysotile	TAS_AHRA
B	16	C3				NSD							

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R02-100204

Lab/Cor Sample No.: B4762 S5 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B44				NSD							
A	2	B24				NSD							
A	3	B4				NSD							
A	4	C14	CDQ	1	1	F	2.3	0.05	46	5486	15363	Mg, Si Chrysotile Verified - KM	TAS_AHRA
A	4	C14	CD	2	2	F	3.1	0.05	62			Chrysotile	TAS_AHRA
A	4	C14	AZQ	3		MD1-1	16	6	2.7			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	4	C14	AZQ		3	MF	16	2.25	7.1	5487	15364	Mg, Si, Ca, Fe Actinolite Zone Axis [7-1 0] - KM	AFB>5, PCMEF-US
A	4	C14	CD	4	4	B	1.6	0.15	11			Chrysotile	TAS_AHRA
A	5	C34				NSD							
A	6	C43				NSD							
A	7	C23	CDQ	5	5	B	14	0.75	19			Mg, Si, Fe Chrysotile	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	8	B44				NSD							
B	9	B24	AQ	6	6	F	2	0.5	4.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	10	B4				NSD							
B	11	C14	AQ	7	7	F	0.55	0.15	3.7			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
B	12	C34				NSD							
B	13	C43	AQ	8	8	F	6.75	1.4	4.8			Mg, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	14	C23	CDQ	9		MD1-0	4.25	2	2.1			Chrysotile	TAS_AHRA
B	14	C23	CDQ		9	MB	4.25	0.75	5.7			Mg, Si, Fe Chrysotile	

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R02-100304

Lab/Cor Sample No.: B4762 S6 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B44			NSD								
A	2	B24	CDQ	1		MD1-0	7	4	1.8			Chrysotile	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	B24	CDQ		1	MF	2.4	0.1	24	5488	15365	Mg, Si, Ca Chrysotile Verified - KM	
A	3	B4			NSD								
A	4	C14	AZQ	2	2	F	1.35	0.25	5.4	5490	15367	Mg, Si, Ca, Fe Actinolite Zone Axis [3-10] - KM	TAS_AHRA
A	5	C34			NSD								
A	6	C43			NSD								
A	7	C23			NSD								
B	8	B41			NSD								
B	9	B11			NSD								
B	10	C11			NSD								
B	11	C41			NSD								
B	12	A31			NSD								
B	13	D11	ADQ	3	3	F	3.8	0.8	4.8			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	14	A11			NSD								

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R03-100104

Lab/Cor Sample No.: B4762 S7 A1

Descriptiton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A22			NSD								
A	2	A30			NSD								
A	3	B10			NSD								
A	4	B13			NSD								
A	5	C13			NSD								
A	6	C41			NSD								
A	7	D31			NSD								
A	8	D12	AQ	1	1	F	9	0.8	11		753	Mg, Al, Si, Ca, Fe Actinolite too dense for diffraction	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	9	A1			NSD								
B	10	A20			NSD								
B	11	B21	AZQ	2	2	F	1.2	0.3	4.0	1025	754	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [3 1 0] - KM	TAS_AHRA
B	11	B21	AQ	3	3	F	2.5	0.5	5.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	12	C1			NSD								
B	13	C32			NSD								
B	14	C40	AQ	4	4	F	3.5	0.5	7.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	14	C40	AQ	5	5	F	4.9	0.55	8.9			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	15	D21	AQ	6	6	F	1.7	0.4	4.2			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	16	D13	AQ	7	7	F	2.8	0.9	3.1			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	17	D1			NSD								
B	18	A3			NSD								

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R03-100204

Lab/Cor Sample No.: B4762 S8 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B43			NSD								
A	2	B13			NSD								
A	3	C13	ADQ	1	1	F	2.7	0.38	7.1			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	4	B21			NSD								
A	5	B1			NSD								
A	6	C11	AZQ	2	2	F	3.2	0.5	6.4	5492	15369	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [1 -1 1] - KM	TAS_AHRA
A	7	A31	ADQ	3	3	F	5.1	0.38	13			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, PSAS 5-10, PSAS TOT, PSAM 5-10, PSAM TOT, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	8	A11			NSD								
B	9	B34			NSD								
B	10	B14			NSD								
B	11	C4			NSD								
B	12	C24			NSD								
B	13	C1	AQ	4	4	F	20	4	5.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	14	C21			NSD								
B	15	C41			NSD								

Lab/Cor, Inc.
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Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R03-100304

Lab/Cor Sample No.: B4762 S9 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B43				NSD							
A	2	B23				NSD							
A	3	B3				NSD							
A	4	C13				NSD							
A	5	A41				NSD							
A	6	A21				NSD							
A	7	A1				NSD							
A	8	D30				NSD							
B	9	B41	AZQ	1		MD1-0	3	0.8	3.8			Actinolite	TAS_AHRA
B	9	B41	AZQ		1	MF	3	0.35	8.6	5493	15370	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [2 0 1] - KM	
B	9	B41				NSD							
B	10	B21				NSD							
B	11	B1				NSD							
B	12	C11				NSD							
B	13	A41				NSD							
B	14	A21				NSD							
B	15	A1				NSD							

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report #: 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R04-100104

Lab/Cor Sample No.: B4762 S10 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A12	AZQ	1	1	F	3.8	0.3	13	1015	744	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [3 1 8] - KM	TAS_AHRA
A	2	B22	AQ	2	2	F	3.5	1	3.5			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	3	B10	AQ	3	3	F	7.5	1	7.5			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	B10	AQ	4		MD1-0	4	1.8	2.2			Actinolite	TAS_AHRA
A	3	B10	AQ		4	MF	4	0.45	8.9			Mg, Al, Si, Ca, Fe Actinolite	
A	3	B10	AQ	5	5	F	4.5	1.2	3.7			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	4	A30			NSD								
A	5	D2	AQ	6	6	F	7.5	1.8	4.2			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	6	D31	AQ	7	7	F	2.5	0.7	3.6			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	7	D23	AQ	8	8	F	4	1.1	3.6			Actinolite	TAS_AHRA
A	8	C10	AQ	9		MD1-1	7.5	4	1.9			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	8	C10	AQ		9	MF	7.5	0.7	11			Mg, Al, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US Ferrianactinolite
A	8	C10	AQ	10	10	F	2.4	0.6	4.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	9	C41	AQ	11	11	F	5	1	5.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
												Ferrianactinolite	
A	10	C22			NSD								
A	11	C14			NSD								
B	12	A30			NSD								
B	13	A11			NSD								
B	14	D21			NSD								
B	15	C40	AQ	12	12	F	3.7	0.5	7.4			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	16	C11			NSD								
B	17	C24	AQ	13	13	F	9	0.8	11			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	18	B1			NSD								
B	19	B20			NSD								

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R04-100204

Lab/Cor Sample No.: B4762 S11 A1

Descriptiton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A32			NSD								
A	2	B20	AZQ	1	1	F	5.2	1.2	4.3	1016	15508	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [1 5 0] - KM	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	C3	CD	2		MD4-0	5.8	4	1.5			Chrysotile	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	C3	CD		2	MF	4	0.08	50	1017		Chrysotile tilts into grid bar - Verified - KM	
A	3	C3	CD		3	MF	3.9	0.08	49			Chrysotile	
A	3	C3	CM		4	MF	3	0.06	50			Chrysotile	
A	3	C3	CD		5	MF	2.3	0.2	12			Chrysotile	
A	3	C3	AQ	3	6	F	2.4	0.3	8.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	4	C31			NSD								
A	5	C10	AQ	4	7	F	4	0.5	8.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	6	D21	AQ	5	8	F	4	0.25	16			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	7	D3			NSD								
A	8	A11			NSD								
B	9	A2			NSD								
B	10	A30	AQ	6		MD1-1	5.1	2.3	2.2			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	10	A30	AQ		9	MF	5.1	0.25	20			Mg, Al, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US, PSAS 5-10, PSAS TOT, PSAM 5-10, PSAM TOT
B	11	B23			NSD								
B	12	C2	AQ	7	10	F	8	0.5	16			Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, PSAS 5-10, PSAS TOT, PSAM 5-10, PSAM TOT, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	13	C31			NSD								
B	14	D21			NSD								
B	15	D1			NSD								

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R04-100304

Lab/Cor Sample No.: B4762 S12 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A22	AZQ	1	1	F	6	0.35	17	1018	246	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [7 1 6] - KM	AS>5, AFB>5, PCMEF-US, PCMES-US, PSAS 5-10, PSAS TOT, PSAM 5-10, PSAM TOT, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	A30				NSD							
A	3	B22	AQ	2	2	F	25	5	5.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	4	C11				NSD							
A	5	C40				NSD							
A	6	D32				NSD							
A	7	D10				NSD							
A	8	A1				NSD							
B	9	A30	AQ	3	3	F	2.4	0.3	8.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	9	A30	AQ	4	4	F	2.8	0.7	4.0			Actinolite	TAS_AHRA
B	10	B22				NSD							
B	11	B2				NSD							
B	12	C31	AQ	5	5	F	4.2	0.5	8.4			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	12	C31	AQ	6	6	F	2.7	0.55	4.9			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	13	C23	AQ	7	7	F	2.5	0.5	5.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	14	D10	AQ	8	8	F	12	2.4	5.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	15	D30				NSD							
B	16	A2				NSD							

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R05-100104

Lab/Cor Sample No.: B4762 S13 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A20	AZQ	1	1	F	8	1	8.0	1019	747	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [5 2 0] - KM	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	B22				NSD							
A	3	B4				NSD							
A	4	C12				NSD							
A	5	C30				NSD							
A	6	D41				NSD							
A	7	D23				NSD							
A	8	D10	AQ	2	2	F	5.2	0.9	5.8			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	9	A11				NSD							
B	10	A30				NSD							
B	11	B13	AQ	3	3	F	12	2.5	4.8			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	11	B13	AQ	4	4	F	11	2.5	4.4			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	12	C1				NSD							
B	13	C32				NSD							
B	14	D40				NSD							
B	15	D32				NSD							
B	16	D10				NSD							

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Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R05-100204

Lab/Cor Sample No.: B4762 S14 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A20			NSD								
A	2	A32	AZQ	1	1	F	3	0.5	6.0	1020	748	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [1 0 0] - KM	TAS_AHRA
A	2	A32	CDQ	2	2	B	9	2.3	3.9	1021	749	Chrysotile Verified - KM	AS>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	A32	AQ	3	3	B	6.2	2.4	2.6			Mg, Al, Si, Ca, Fe Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	B10	AQ	4		MD1-1	10	7	1.4			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	3	B10	AQ		4	MF	10	1	10			Mg, Al, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	4	B23			NSD								
A	5	B3			NSD								
A	6	C23	AQ	5	5	F	7	1.4	5.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	7	C30			NSD								
A	8	D11			NSD								
B	9	A12			NSD								
B	10	A31	AQ	6	6	F	2.3	0.51	4.5			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	10	A31	AQ	7	7	F	3.5	0.6	5.8			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	11	B20			NSD								
B	12	B23	CDQ	8		MD1-0	4	2.7	1.5			Chrysotile	TAS_AHRA
B	12	B23	CDQ		8	MF	4	0.05	80			Mg, Si Chrysotile	
B	13	C11			NSD								
B	14	C40			NSD								
B	15	D2			NSD								

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R05-100304

Lab/Cor Sample No.: B4762 S15 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A30				NSD							
A	2	B10				NSD							
A	3	B42				NSD							
A	4	C22				NSD							
A	5	C31	AZQ	1	1	F	2.8	0.5	5.6	1022	750	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [4 0 3] - KM	TAS_AHRA
A	6	D20				NSD							
A	7	D2				NSD							
B	8	B30	AQ	2	2	F	2.6	0.4	6.5			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	9	B2				NSD							
B	10	C21				NSD							
B	11	C30				NSD							
B	12	D22	CDQ	3		MD1-0	3	1.5	2.0			Chrysotile	TAS_AHRA
B	12	D22	CDQ		3	MF	3	0.05	60	1023	751	Mg, Si Chrysotile Verified - KM	
B	13	D1				NSD							
B	14	A12				NSD							

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041174R2

Client: Ecology and Environment, Inc.

Project Name: Site# 0440.01CP, 0440.01CP-0010- FINAL RESULTS

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: SRA-R101-100204

Lab/Cor Sample No.: B4762 S16 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A12			NSD								
A	2	A30			NSD								
A	3	B21			NSD								
A	4	B14			NSD								
A	5	C2	CDQ	1	1	F	1.6	0.05	32	1024	752	Mg, Si Chrysotile Verified - KM	TAS_AHRA
A	6	C33			NSD								
A	7	D30	CDQ	2	2	B	4	0.3	13			Mg, Si Chrysotile	TAS_AHRA
B	8	A2	CDQ	3	3	B	6	0.15	40			Mg, Si Chrysotile	AS>5, AFB>5, PSAS 5-10, PSAS TOT, PCAS 5-10, PCAS TOT, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	9	A32			NSD								
B	10	B40			NSD								
B	11	B22			NSD								
B	12	C1			NSD								
B	13	C30			NSD								
B	14	D10			NSD								

NSD = No Structures Detected

PAS = Primary Asbestos Structures

TAS = Total Asbestos Structures

AS>5 = Asbestos Structures > 5um

AFB>5 = Asbestos Fibers and Bundles > 5um

PCMEF-US = PCM Equivalent Fibers-US

PCMES-US = PCM Equivalent Structures-US

PCMEF-ISO = PCM Equivalent Fibers-ISO

PCMES-ISO = PCM Equivalent Structures-ISO

PSAS 5-10 = PROTOCOL ASB STRUCS 5-10

PSAS >10 = PROTOCOL ASB STRUCS >10

PSAS TOT = PROTOCOL ASB STRUCS TOTAL

PSCH 5-10 = PROTOCOL CHRYS STRUCS 5-10

PSCH >10 = PROTOCOL CHRYS STRUCS >10

PSCH TOT = PROTOCOL CHRYS STRUCS TOTAL

PSAM 5-10 = PROTOCOL AMPH STRUCS 5-10

PSAM >10 = PROTOCOL AMPH STRUCS >10

PSAM TOT = PROTOCOL AMPH STRUCS TOTAL

TAS_AHRA = AHERA-like Total Strucs 3:1

AS>5_AHRA = AHERA-like Asb Strucs >5 and 3:1

AS5-10_AHRA = AHERA-like Asb Strucs 5 - 10 and 3:1

AS>10_AHRA = AHERA-like Asb Strucs >10 and 3:1

TOS_AHRA = Total Other Amphibole Strucs 3:1

OS>5_AHRA = Other Amphibole Struc >5 and 3:1

OS5-10_AHRA = Other Amphibole Struc 5 - 10 and 3:1

OS>10_AHRA = Other Amphibole Strucs >10 and 3:1

CF = Cleavage Fragments

TS = Transitional Structures

PChS = Primary Chrysotile Structures

PAmS = Primary Amphibole Structures

B4762

Page 1 of 2

04/17/04 102

No: 0440.01CP-0010

EPA Contract #:

CHAIN OF CUSTODY RECORD

Site #: 0440.01CP

Contact Name:

Contact Phone:

Cooler #:

Lab:

Lab Phone:

Lab #	Sample #	Analyses	Matrix	Date Collected	Sample Time	Numb Cont	Volume	Vol Units	Priority
-17	AAMS-1ZB-092904	ISO 10312	Air	9/29/2004	9:20	1	4800	Liters	
-18	AAMS-1ZB-100204	ISO 10312	Air	10/2/2004	9:25	1	4800	Liters	
-19	AAMS-2ZB-100204	ISO 10312	Air	10/2/2004	9:28	1	4810	Liters	
-20	AAMS-D01-092704	ISO 10312	Air	9/27/2004	13:11	1	6182.8	Liters	
-21	AAMS-D02-092804	ISO 10312	Air	9/28/2004	13:15	1	6087.64	Liters	
-22	AAMS-D03-092904	ISO 10312	Air	9/29/2004	13:19	1	6216	Liters	
-23	AAMS-D04-093004	ISO 10312	Air	9/30/2004	13:21	1	6181.68	Liters	
-24	AAMS-D05-100104	ISO 10312	Air	10/1/2004	13:23	1	6278.79	Liters	
-25	AAMS-D06-100204	ISO 10312	Air	10/2/2004	13:36	1	7604.42	Liters	
-26	AAMS-D07-100304	ISO 10312	Air	10/3/2004	13:49	1	7242.84	Liters	
-27	AAMS-D107-100304	ISO 10312	Air	10/3/2004	13:50	1	7221.6	Liters	
-28	AAMS-FB-093004	ISO 10312	Air	9/30/2004	9:15	1	4800	Liters	
29	AAMS-FB-100204	ISO 10312	Air	10/2/2004	9:23	1	0	Liters	
-01	SRA-R01-100104	ISO 10312	Air	10/1/2004	13:25	1	5457.94	Liters	2
-02	SRA-R01-100204	ISO 10312	Air	10/2/2004	13:38	1	6577.89	Liters	2
-03	SRA-R01-100304	ISO 10312	Air	10/3/2004	13:52	1	6339.84	Liters	2
-04	SRA-R02-100104	ISO 10312	Air	10/1/2004	13:28	1	5871.9	Liters	2
-05	SRA-R02-100204	ISO 10312	Air	10/2/2004	13:41	1	6661.15	Liters	2
-06	SRA-R02-100304	ISO 10312	Air	10/3/2004	15:19	1	6350.89	Liters	2
-07	SRA-R03-100104	ISO 10312	Air	10/1/2004	13:30	1	5485.48	Liters	2

Comments: ISO 10312 PER STATEMENT OF WORK, STANDARD TURN AROUND TIME	SAMPLES TRANSFERRED FROM
	CHAIN OF CUSTODY # <i>Sample Set #1</i>

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	<i>S. Moun</i>	10/3/04	<i>Malo</i>	10/3/04	1500						
	<i>Malo</i>	10/6/04	FED-X B/L# 829691973701	10/6/04	1848						
			<i>W Jones</i>	10/7/04	9:45						

B4762

Page 2 of 2

041174 292

CHAIN OF CUSTODY RECORD

No: 0440.0TCP-0010

EPA Contract #:

Site #: 0440 01CE

Contact Name

Contact Phone

Cooler #:

Lab:

Phone:

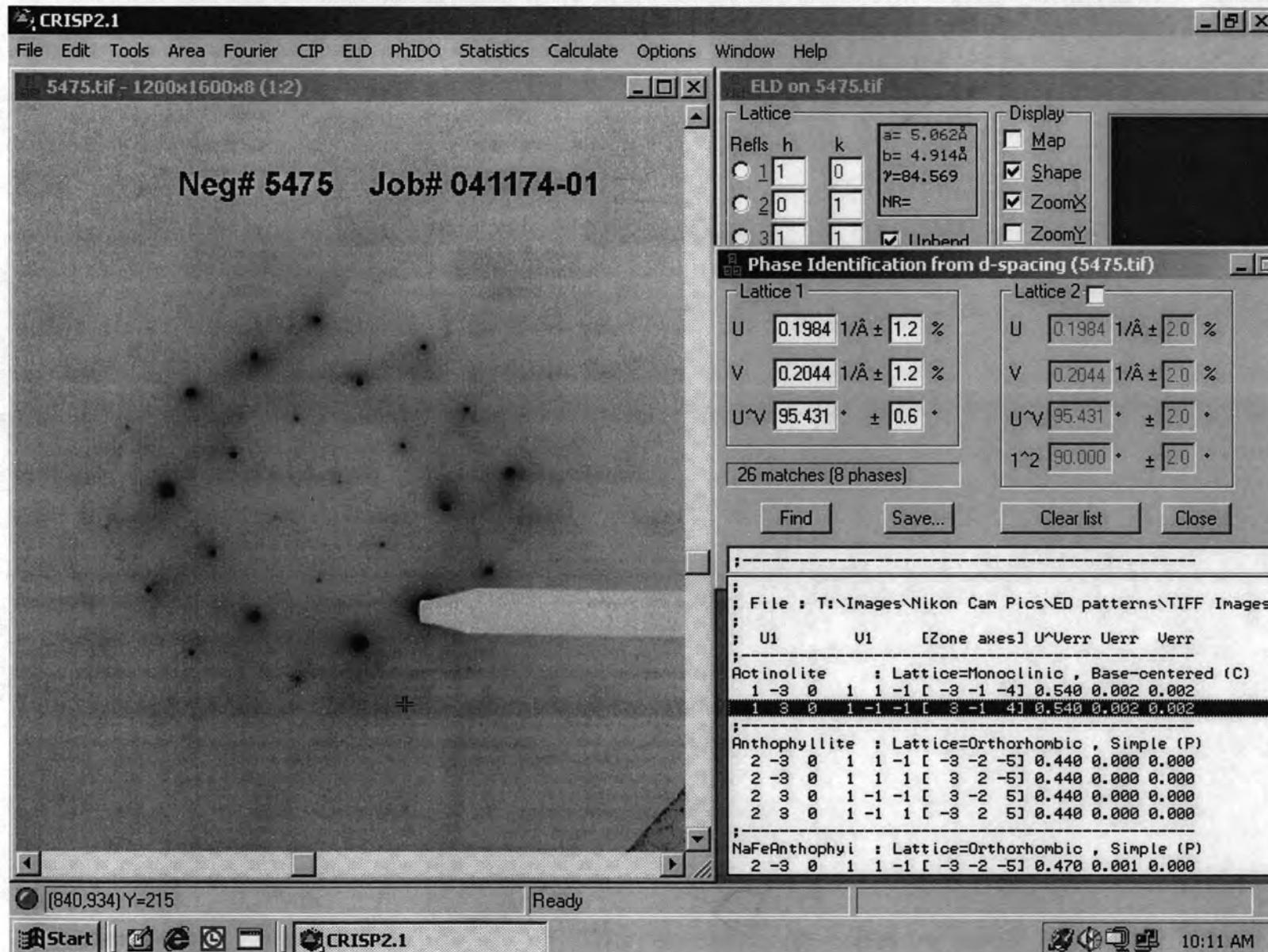
Lab Phone:

Comments: ISO 10312 PER STATEMENT OF WORK, STANDARD TURN AROUND TIME	SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #
--	--

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	S. Moun	10/3/04	M. Lewis	10/3/04	1500						
	M. Kla	10/6/04	FED-X	10/6/04	1845						
			W Jones	10/7/04	9:45						

ACTINOLITE

[3 -1 4]



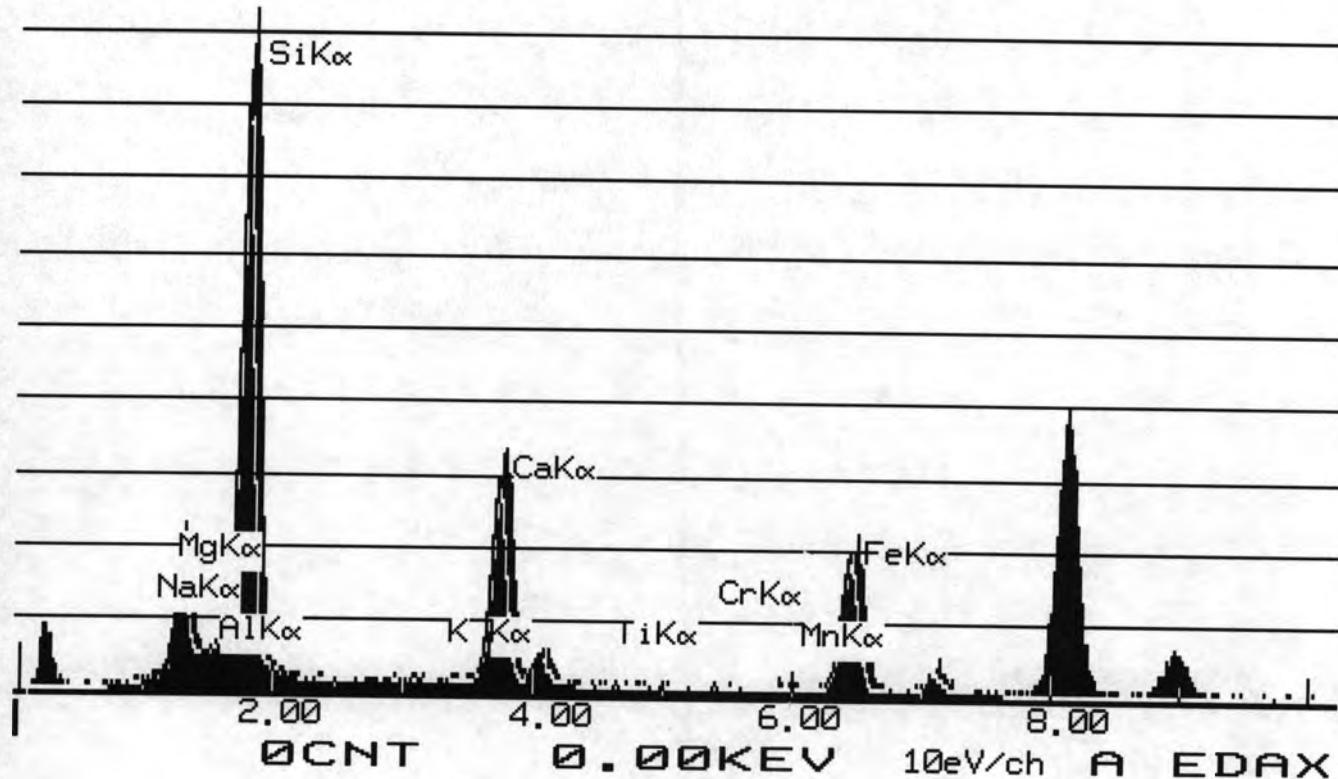
INTE-% :
LABEL = 041174-01 SP 15353
23-NOV-72 20:59:02
19.372 LIVE SECONDS

ELEM	CPS	WT %	ELEM	WT %
MGK	89.045	8.688	OXIDE	14.406
SIK	479.347	26.305		56.276
CAK	191.150	10.001		13.994
CRK	1.652	0.120		0.176
MNK	5.369	0.405		0.523
FEK	147.170	10.229		14.625

TOTAL		100.000		

USED PEIF: USER

22-NOV-04 20:59:36 SUPER QUANT
RATE= 0CPS TIME= 19LSEC
FS= 1137/ 1137 PRST= 200LSEC
A =041174-01 SP 15353



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	56.276	Si+4	7.9925	7.9925							
Al ₂ O ₃	0	Al+3	0.0000	0.0000	0.0000						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0.176	Cr+3	0.0198			0.0198	0.0000				
Fe(total)O	14.625	Fe+3	0.0156			0.0156	0.0000				
MgO	14.406	Mg+2	3.0502			3.0502	0.0000				
MnO	0.523	Fe+2	1.7195			1.7195	0.0000				
CaO	13.994	Mn+2	0.0629			0.0629	0.0000				
Na ₂ O	0	Ca+2	2.1292					2.0000	0.1292		
K ₂ O	0	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0000							0.0000	0.0000
Total	100		Excess	T site	0.0000	C site	0.0000	B site	0.1292435	A site	0

		Total	7.9925		4.8680		2.0000		0.0000	0.0000
		%Fill	99.907		97.3597		100			

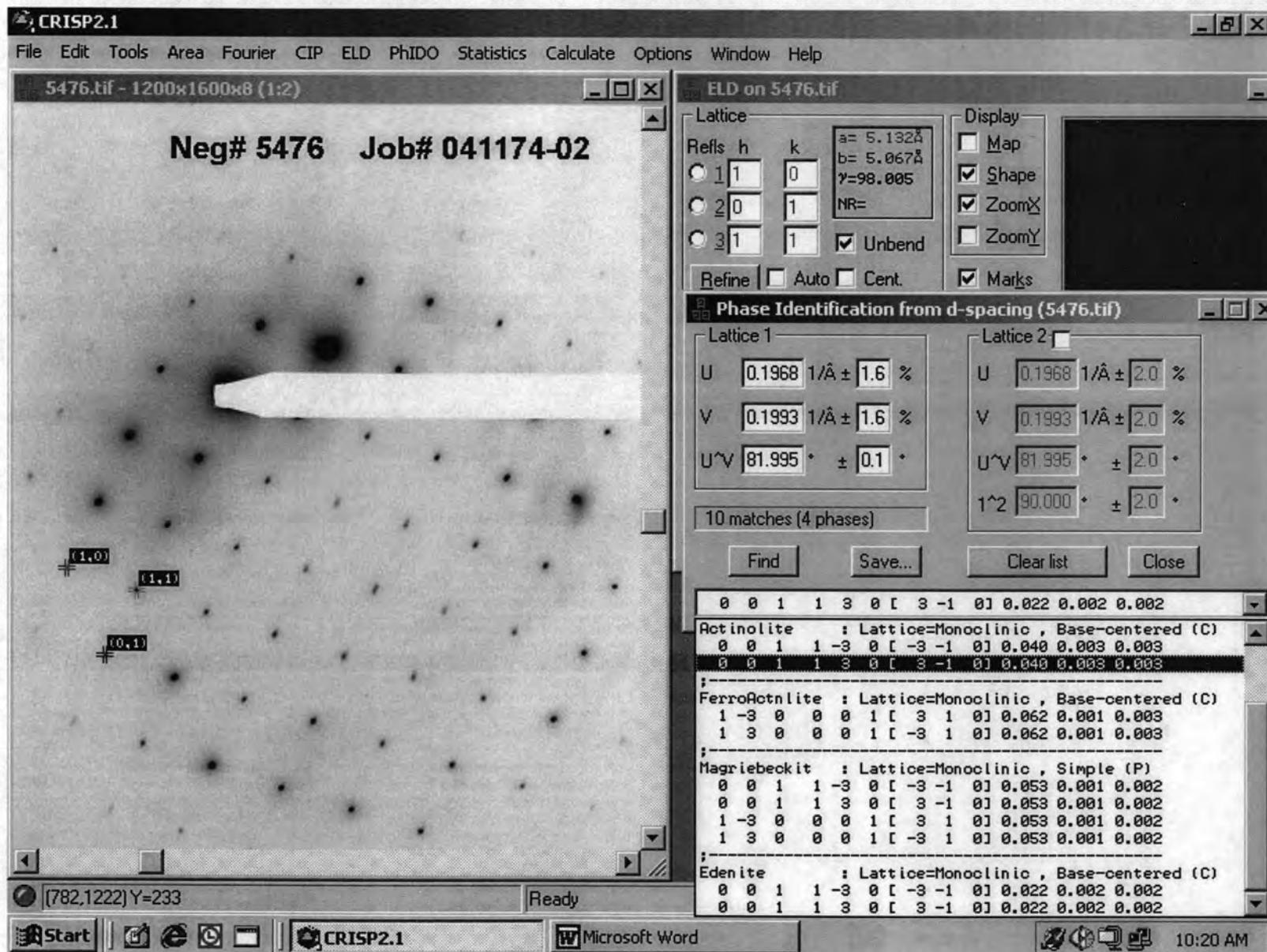
Prefix none
Name actinolite
Modifier none
Group Calcic Amphibole

Sample # 041174-01-15353

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	2.00 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.64 (Mg/(Mg+Fe2))< 0.9
Si	7.99

ACTINOLITE

[3 - 1 0]



INTE-% :

LABEL = 041174-02 SP 15354

23-NOV-72 21:02:34

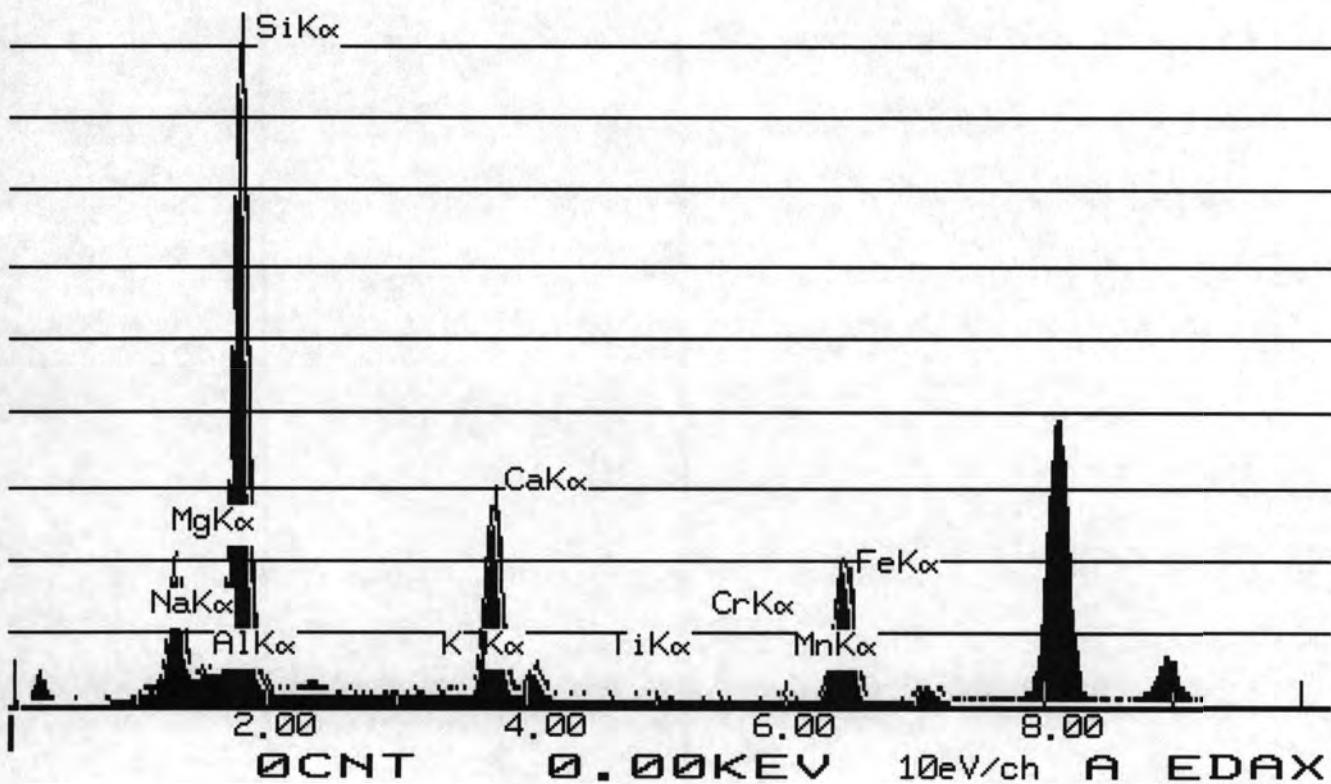
127.118 LIVE SECONDS

ELEM	CPS	WT %	ELEM	WT %
MGK	28.910	9.168	OXIDE	15.201
ALK	2.517	0.480		0.906
SIK	148.830	26.544		56.787
K K	1.424	0.422		0.508
CAK	51.511	8.759		12.256
CRK	0.189	0.045		0.065
MNK	1.235	0.303		0.391
FEK	42.991	9.711		13.885

TOTAL		100.000		

USED PEIF: USER

22-NOV-04 21:03:02 SUPER QUANT
RATE= 0CPS TIME= 127LSEC
FS= 2115/ 2115 PRST= 200LSEC
A =041174-02 SP 15354



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	56.787	Si+4	7.9917	7.9917							
Al2O3	0.906	Al+3	0.1503	0.0083	0.1420						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0.065	Cr+3	0.0072			0.0072	0.0000				
Fe(total)O	13.885	Fe+3	0.0441			0.0441	0.0000				
MgO	15.201	Mg+2	3.1892			3.1892	0.0000				
MnO	0.391	Fe+2	1.5849			1.5849	0.0000				
CaO	12.256	Mn+2	0.0466			0.0325	0.0141				
Na2O	0	Ca+2	1.8478				1.8478	0.0000			
K2O	0.508	Na+	0.0000				0.0000	0.0000	0.0000	0.0000	
		K+	0.0912						0.0912	0.0000	
Total	99.999		Excess	T site	0.1420	C site	0.0141	B site	0	A site	0

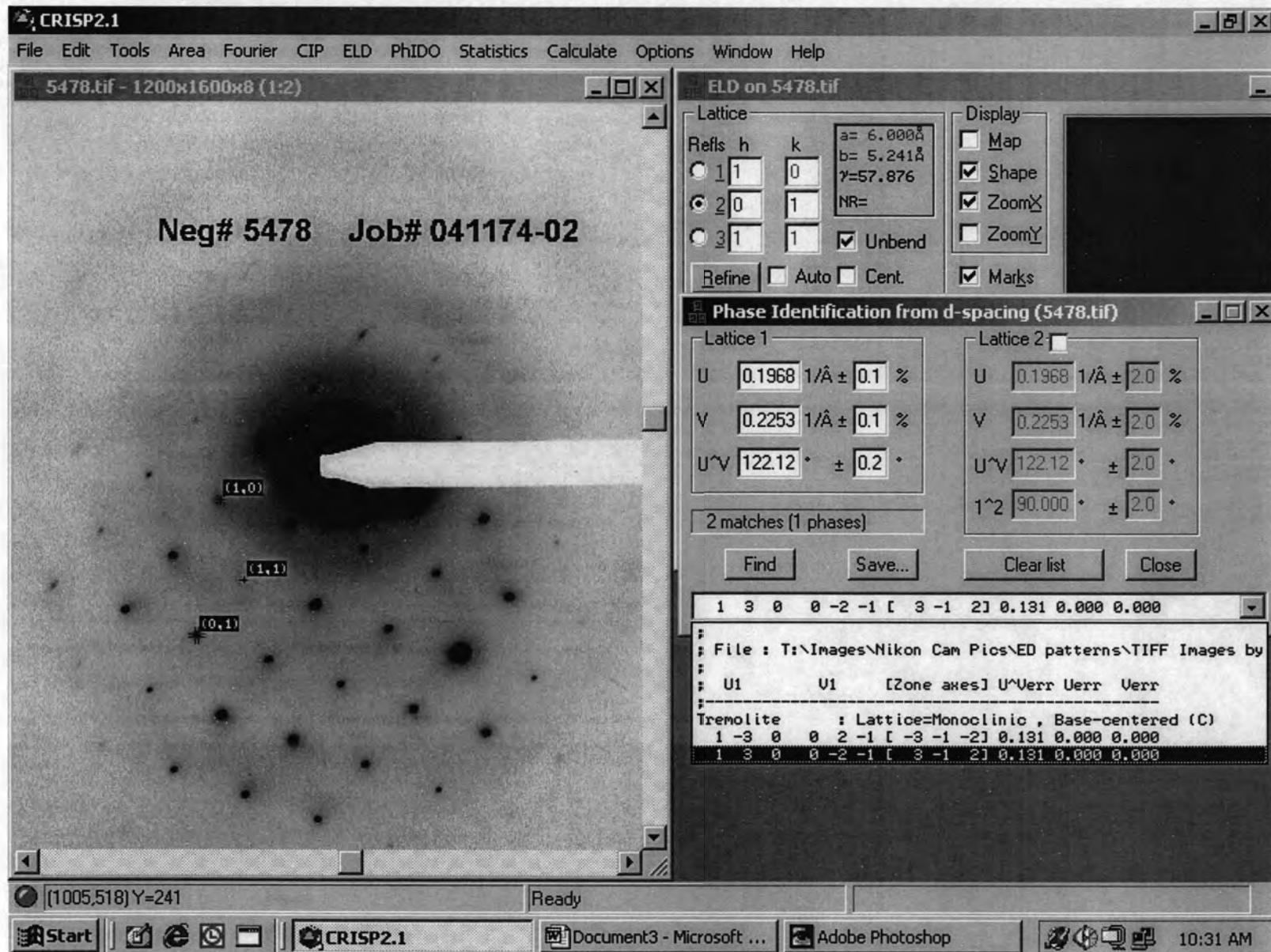
Prefix	none	Total	8	5.0000	1.8478	0.0912	0.0000
Name	actinolite	%Fill	100	100	92.3913		
Modifier	none						
Group	Calcic Amphibole						

Sample # 041174-02-15354

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.85 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.85 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.09 Si > 7.5
Mg/(Mg+Fe2)	0.67 (Mg/(Mg+Fe2))< 0.9
Si	7.99

TREMOLITE

[3 -1 2]



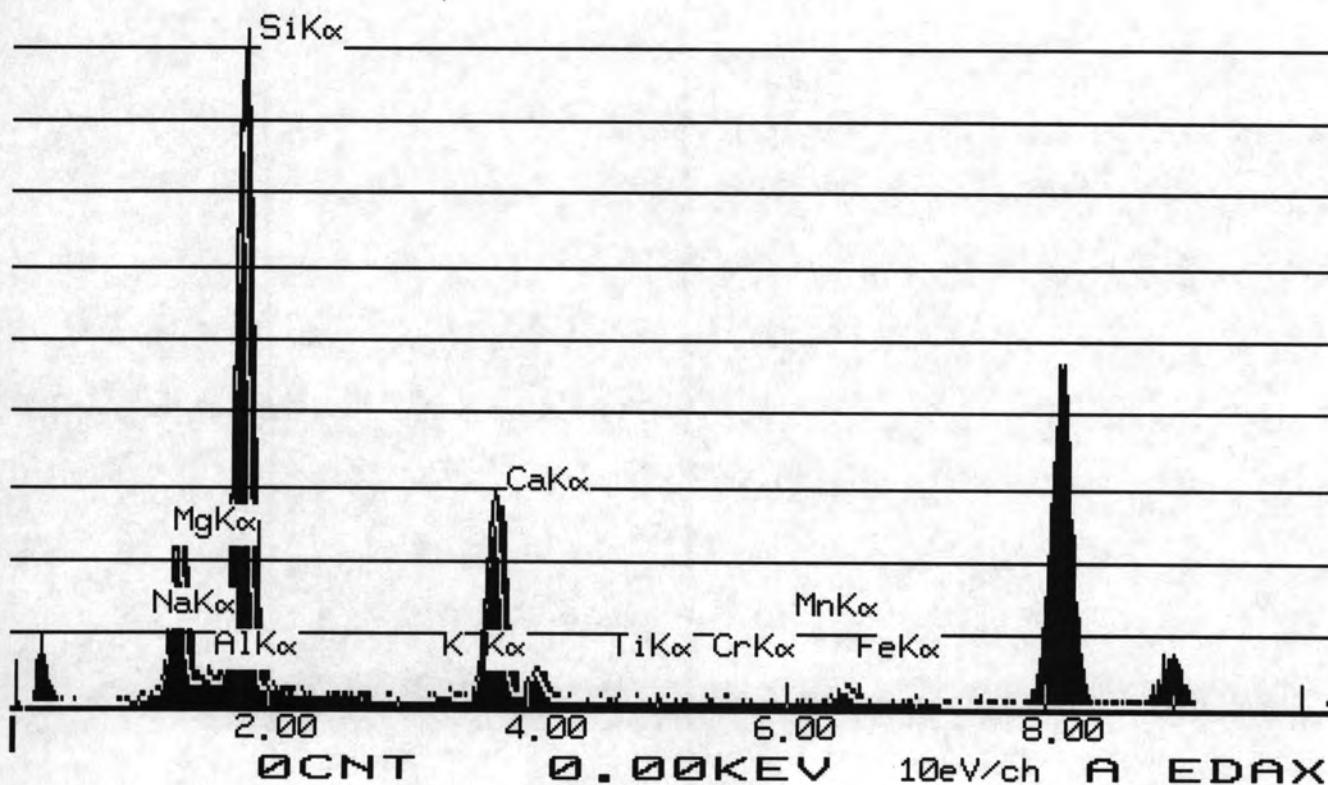
INTE-% :
LABEL = 041174-02 SP 15355
23-NOV-72 21:08:07
24.897 LIVE SECONDS

ELEM	CPS	WT %	ELEM	WT %
NAK	0.884	0.236	OXIDE	0.318
MGK	110.575	13.959		23.145
ALK	8.154	0.618		1.168
SIK	390.608	27.733		59.330
K K	3.494	0.412		0.497
CAK	147.246	9.967		13.946
FEK	12.411	1.116		1.596

TOTAL				100.000

USED PEIF: USER

22-NOV-04 21:08:31 SUPER QUANT
RATE= 0CPS TIME= 24LSEC
FS= 1146/ 1146 PRST= 200LSEC
A =041174-02 SP 15355



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	59.33	Si+4	7.9274	7.9274							
Al2O3	1.168	Al+3	0.1839	0.0726	0.1114						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	1.596	Fe+3	0.0016			0.0016	0.0000				
MgO	23.145	Mg+2	4.6104			4.6104	0.0000				
MnO	0	Fe+2	0.1765			0.1765	0.0000				
CaO	13.946	Mn+2	0.0000			0.0000	0.0000				
Na2O	0.318	Ca+2	1.9963					1.9963	0.0000		
K2O	0.497	Na+	0.0824					0.0037	0.0787	0.0787	0.0000
		K+	0.0847							0.0847	0.0000
Total	100		Excess	T site	0.1114	C site	0.0000	B site	0.0786961	A site	0

Prefix	none	Total	8	4.8999	2.0000	0.1634	0.0000
Name	tremolite	%Fill	100	97.9986	100		

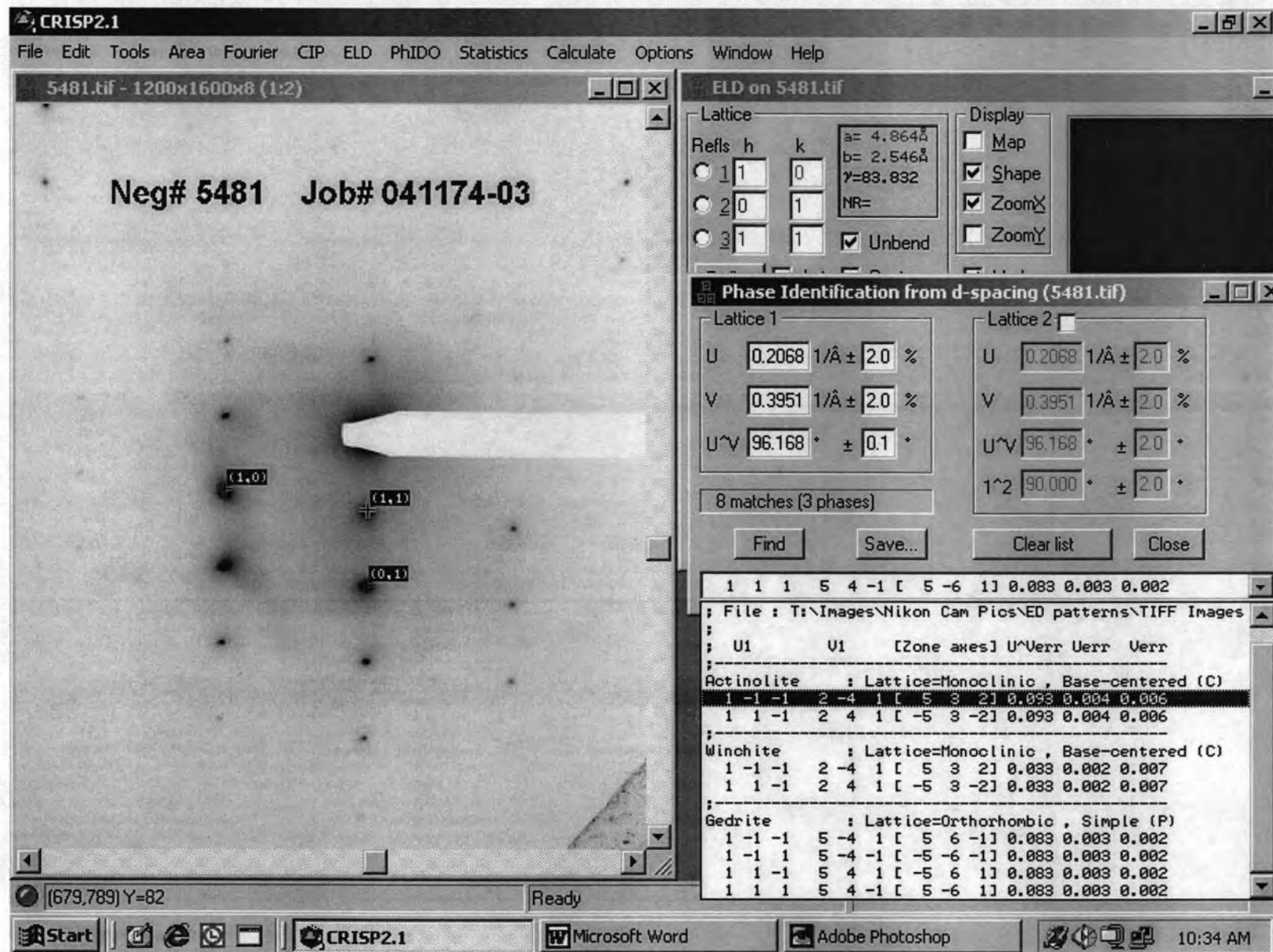
Modifier none
 Group Calcic Amphibole

Sample # 041174-02-15355

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	2.00 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.16 Si > 7.5
Mg/(Mg+Fe2)	0.96 (Mg/(Mg+Fe2))>= 0.9
Si	7.93

ACTINOLITE

[532]



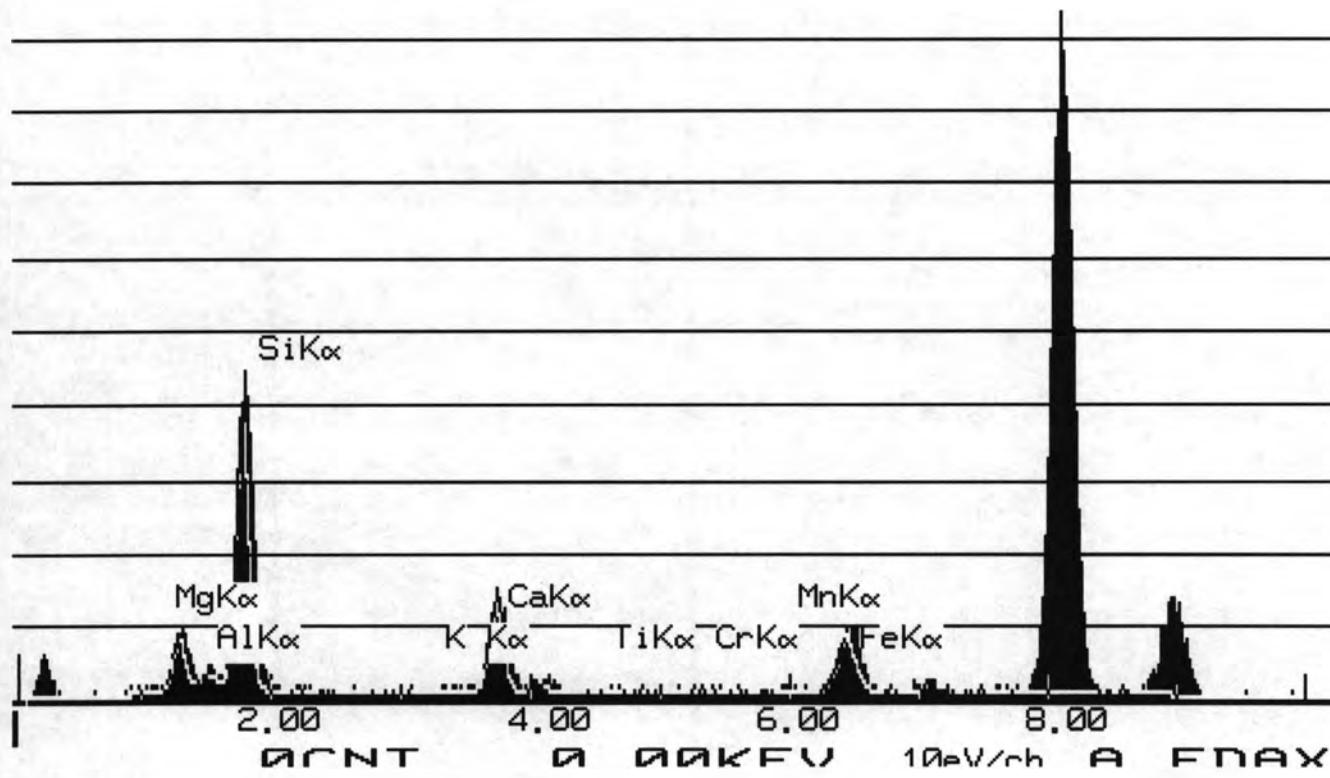
INTE-% :
LABEL = 041174-03 SP 15358
23-NOV-72 21:11:33
32.740 LIVE SECONDS

ELEM	CPS	WT %	WT %
NAK	0.580	0.464	0.626
MGK	22.266	8.406	13.939
ALK	4.673	1.060	2.002
SIK	125.321	26.610	56.929
K K	1.863	0.657	0.792
CAK	46.029	9.318	13.038
TIK	0.916	0.262	0.436
FEK	31.826	8.559	12.238

TOTAL		100.000	

USED PEIF: USER

22-NOV-04 21:13:20 SUPER QUANT
RATE= 8CPS TIME= 32LSEC
FS= 1030/ 1030 PRST= 200LSEC
A =041174-03 SP 15358



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	56.929	Si+4	7.9751	7.9751							
Al ₂ O ₃	2.002	Al+3	0.3305	0.0249	0.3056						
TiO ₂	0.436	Ti+4	0.0459	0.0000	0.0459						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	12.238	Fe+3	0.0129			0.0129	0.0000				
MgO	13.939	Mg+2	2.9111			2.9111	0.0000				
MnO	0	Fe+2	1.4192			1.4192	0.0000				
CaO	13.038	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0.626	Ca+2	1.9567					1.9567	0.0000		
K ₂ O	0.792	Na+	0.1700					0.0433	0.1268	0.1268	0.0000
		K+	0.1415							0.1415	0.0000
Total	100		Excess	T site	0.3515	C site	0.0000	B site	0.1267587	A site	0

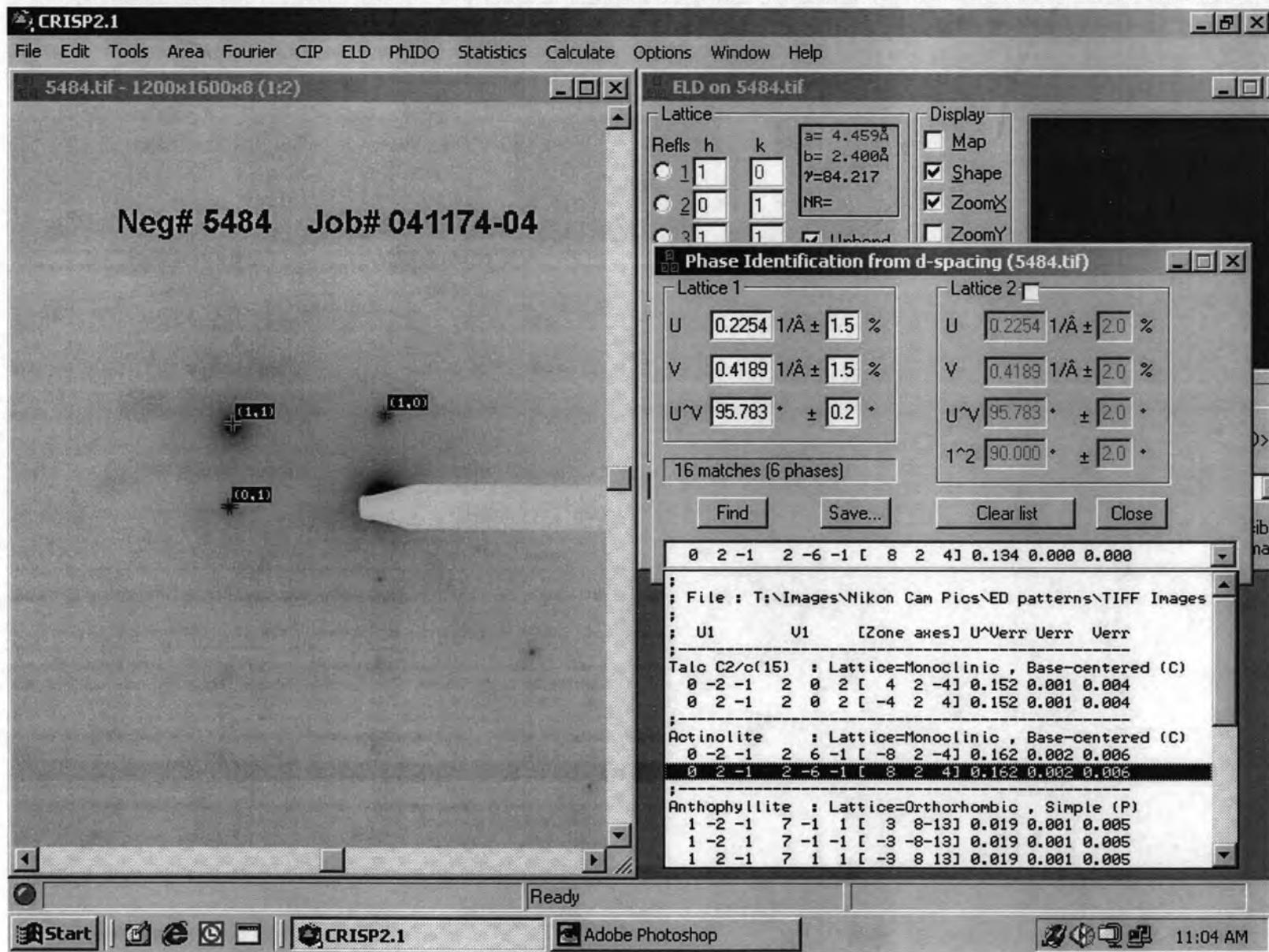
Prefix	none	Total	8	4.6948	2.0000	0.2683	0.0000
Name	actinolite	%Fill	100	93.8952	100		
Modifier	none						
Group	Calcic Amphibole						

Sample # 041174-03-15358

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.04 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.96 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.27 Si > 7.5
Mg/(Mg+Fe2)	0.67 (Mg/(Mg+Fe2))< 0.9
Si	7.98

ACTINOLITE

[4 1 2]



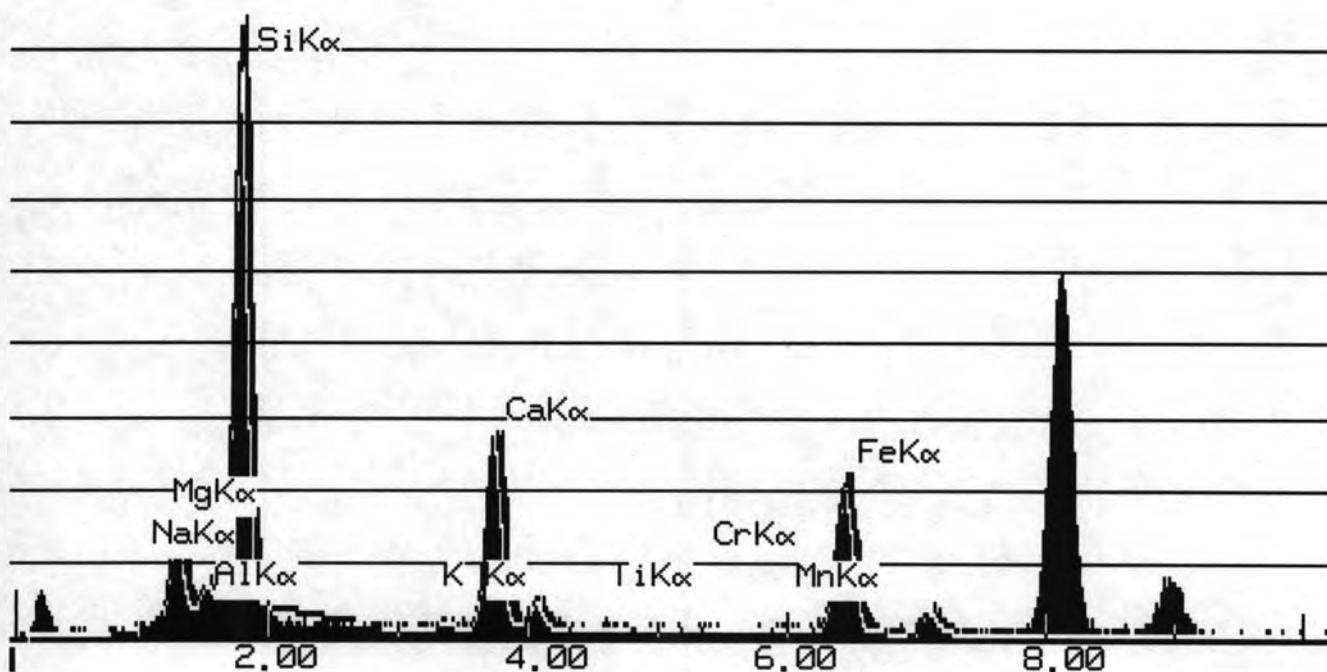
INTE-% :
LABEL = 041174-04 SP 15361
23-NOV-72 21:17:13
19.305 LIVE SECONDS

ELEM	CPS	WT %	WT %
		ELEM	OXIDE
MGK	79.048	7.811	12.951
ALK	21.912	1.301	2.457
SIK	455.691	25.324	54.177
K K	6.268	0.579	0.697
CAK	176.071	9.329	13.053
TIK	4.092	0.306	0.510
CRK	2.797	0.206	0.301
MNK	4.817	0.368	0.476
FEK	152.812	10.756	15.378

TOTAL		100.000	

USED PEIF: USER

22-NOV-04 21:17:37 SUPER QUANT
RATE= 12CPS TIME= 19LSEC
FS= 1082/ 1082 PRST= 200LSEC
A =041174-04 SP 15361



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	54.177	Si+4	7.7461	7.7461							
Al ₂ O ₃	2.457	Al+3	0.4140	0.2539	0.1601						
TiO ₂	0.51	Ti+4	0.0548	0.0000	0.0548						
Cr ₂ O ₃	0.301	Cr+3	0.0340			0.0340	0.0000				
Fe(total)O	15.378	Fe+3	0.0165			0.0165	0.0000				
MgO	12.951	Mg+2	2.7605			2.7605	0.0000				
MnO	0.476	Fe+2	1.8201			1.8201	0.0000				
CaO	13.053	Mn+2	0.0576			0.0576	0.0000				
Na ₂ O	0	Ca+2	1.9994					1.9994	0.0000		
K ₂ O	0.697	Na+	0.0000					0.0000	0.0000	0.0000	
		K+	0.1271							0.1271	0.0000
Total	100		Excess	T site	0.2149	C site	0.0000	B site	0	A site	0

	Total	8	4.9038	1.9994	0.1271	0.0000
	%Fill	100	98.0766	99.97		

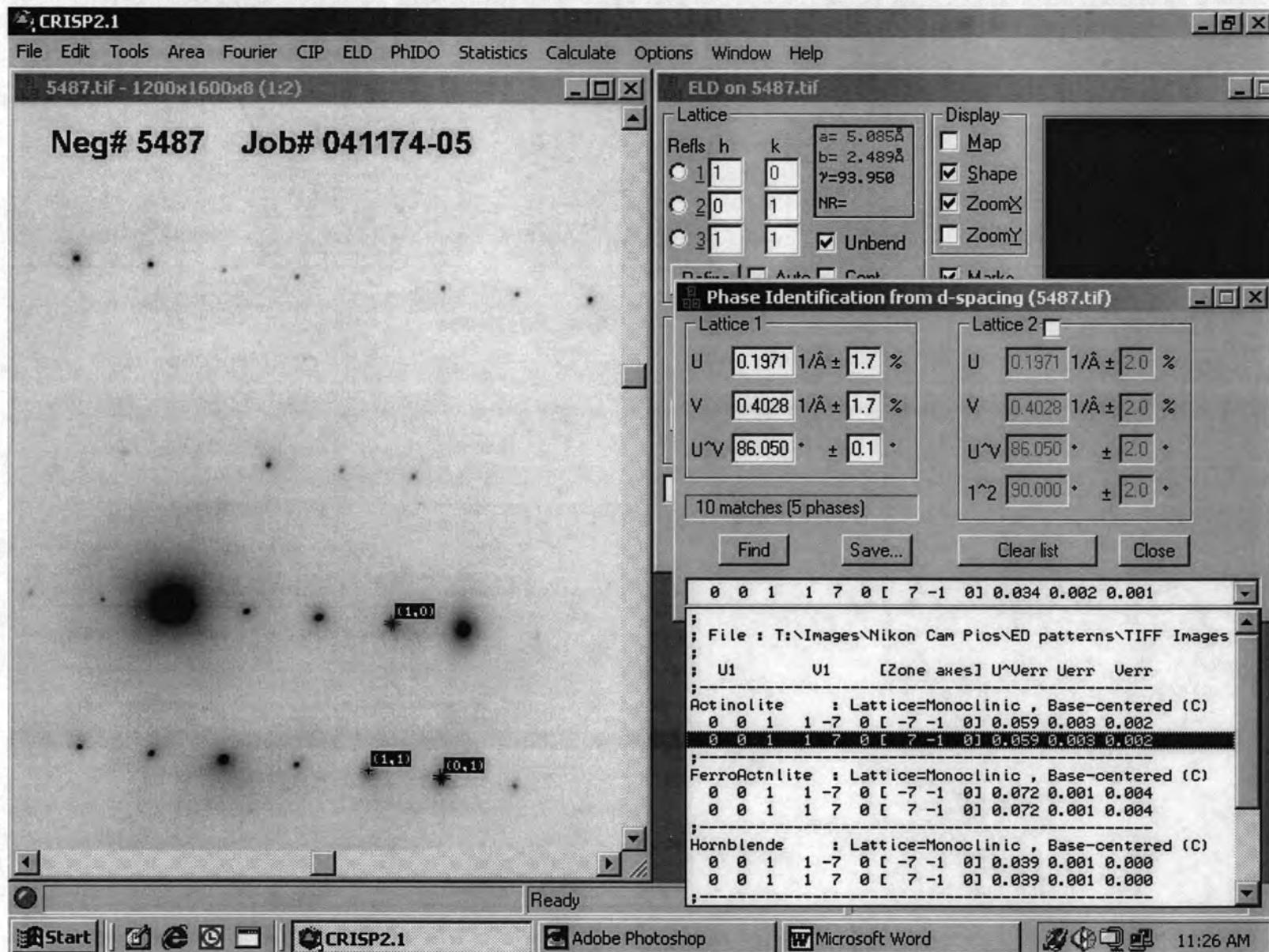
Prefix none
 Name actinolite
 Modifier none
 Group Calcic Amphibole

Sample # 041174-04-15361

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	2.00 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.13 Si > 7.5
Mg/(Mg+Fe2)	0.60 (Mg/(Mg+Fe2))< 0.9
Si	7.75

ACTINOLITE

[7 -1 0]



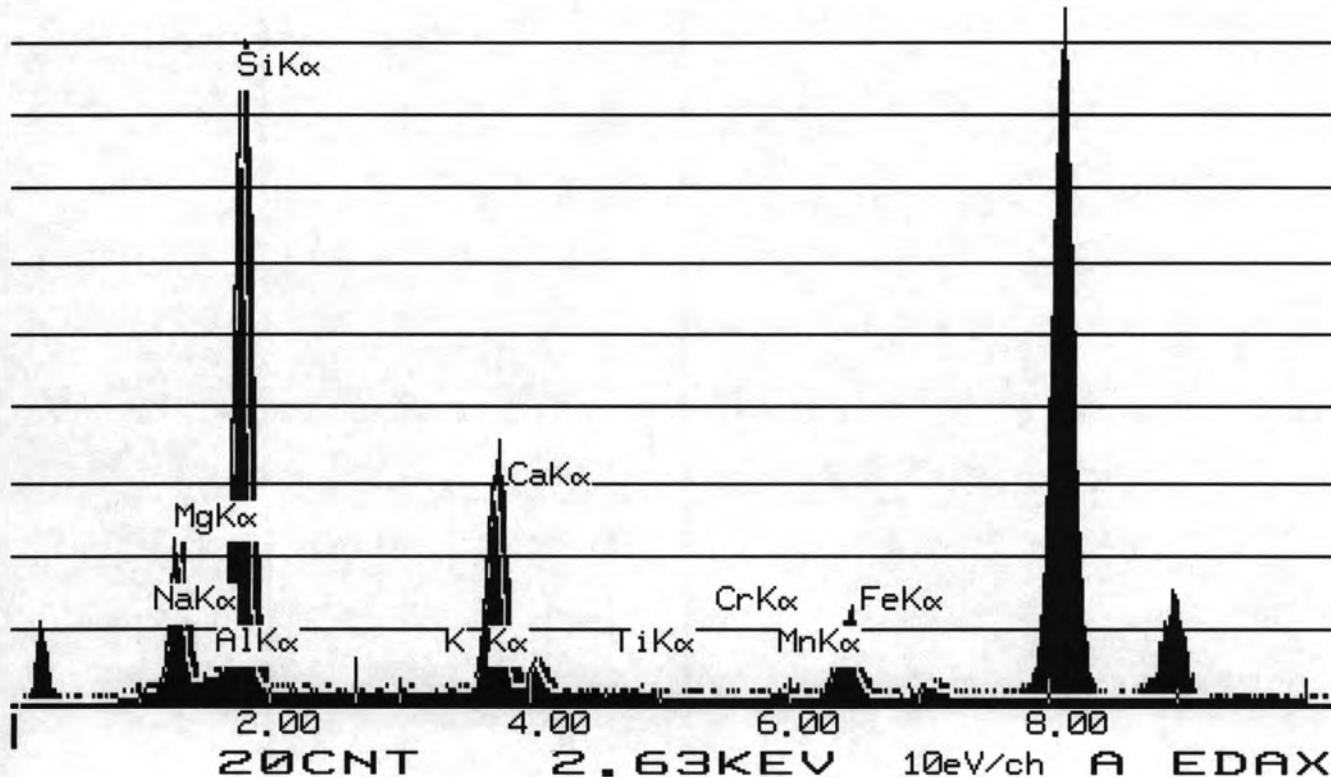
INTE-% :
LABEL = 041174-05 15364
15-NOV-72 00:16:46
25.234 LIVE SECONDS

ELEM	CPS	WT %	WT %
NAK	0.832	0.215	0.290
MGK	97.882	11.956	19.824
ALK	1.863	0.137	0.258
SIK	389.113	26.731	57.188
CAK	156.018	10.219	14.298
CRK	0.793	0.072	0.106
MNK	2.180	0.206	0.266
FEK	62.455	5.434	7.769

TOTAL		100.000	

USED PEIF: USER

14-NOV-04 00:17:21 SUPER QUANT
RATE= 69CPS TIME= 25LSEC
FS= 1138/ 1138 PRST= 200LSEC
A =041174-05 15364



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	57.188	Si+4	7.8830	7.8830							
Al ₂ O ₃	0.258	Al+3	0.0419	0.0419	0.0000						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0.106	Cr+3	0.0116			0.0116	0.0000				
Fe(total)O	7.769	Fe+3	0.0081			0.0081	0.0000				
MgO	19.824	Mg+2	4.0738			4.0738	0.0000				
MnO	0.266	Fe+2	0.8865			0.8865	0.0000				
CaO	14.298	Mn+2	0.0311			0.0200	0.0110				
Na ₂ O	0.29	Ca+2	2.1115					1.9890	0.1225		
K ₂ O	0	Na+	0.0775					0.0000	0.0775	0.0775	0.0000
		K+	0.0000						0.0000	0.0000	
Total	99.999		Excess	T site	0.0000	C site	0.0110	B site	0.2000089	A site	0

		Total	7.9249		5.0000		1.9890		0.0775	0.0000
		%Fill	99.062		100		99.4482			

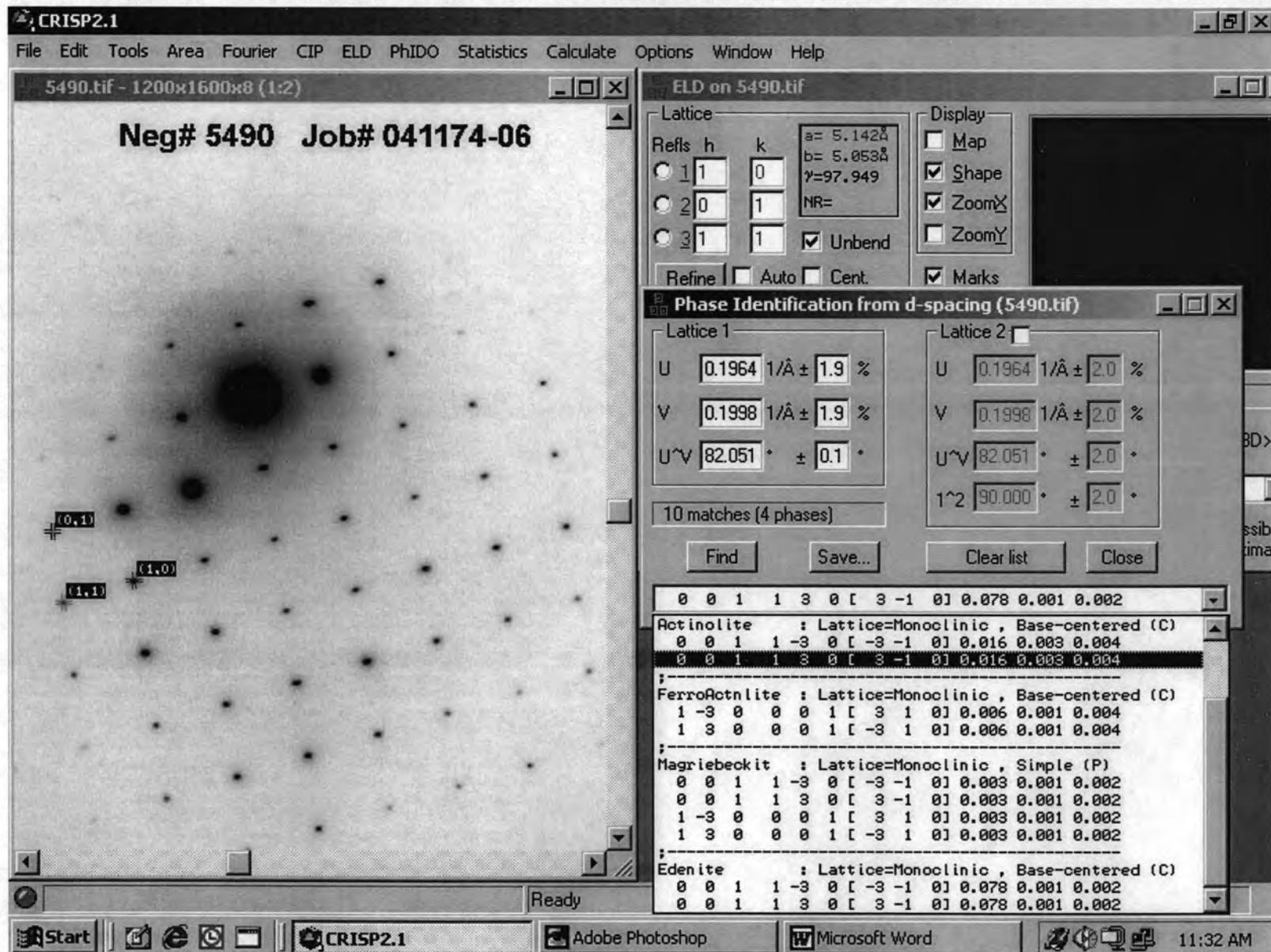
Prefix none
 Name actinolite
 Modifier none
 Group Calcic Amphibole

Sample # 041174-05-15364

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.99 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.99 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.08 Si > 7.5
Mg/(Mg+Fe2)	0.82 (Mg/(Mg+Fe2))< 0.9
Si	7.88

ACTINOLITE

[3 -1 0]



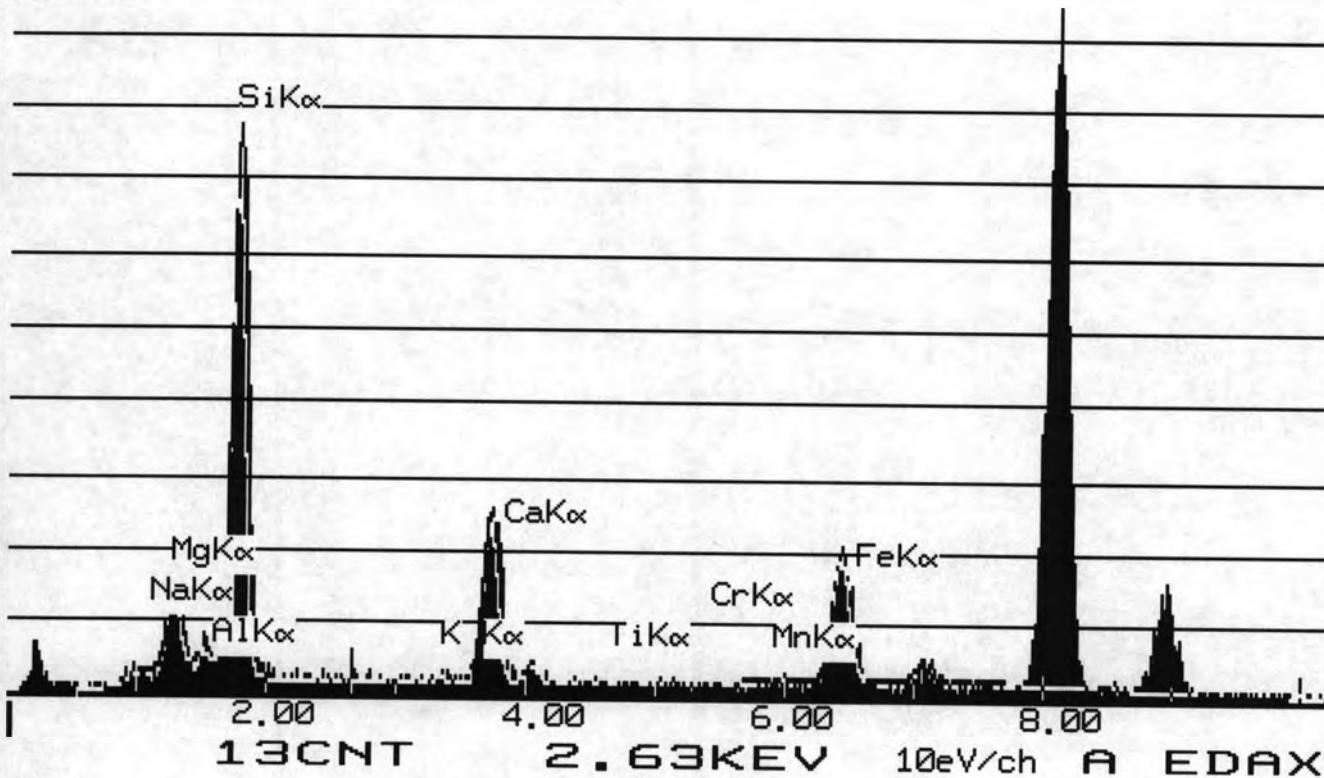
INTE-% :
LABEL = 041174-06 15367
15-NOV-72 03:44:15
60.313 LIVE SECONDS

ELEM	CPS	WT %	ELEM	WT %
MGK	11.009	7.554	OXIDE	12.525
ALK	1.890	0.779		1.472
SIK	68.277	26.349		56.370
K K	1.111	0.712		0.858
CAK	25.915	9.535		13.341
FEK	22.085	10.795		15.433

TOTAL		100.000		

USED PEIF: USER

14-NOV-04 03:44:49 SUPER QUANT
RATE= 673CPS TIME= 60LSEC
FS= 550/ 550 PRST= 200LSEC
A =041174-06 15367



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	56.37	Si+4	8.0000	8.0000							
Al ₂ O ₃	1.472	Al+3	0.2478	0.0000	0.2478						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	15.433	Fe+3	0.0173			0.0173	0.0000				
MgO	12.525	Mg+2	2.6574			2.6574	0.0000				
MnO	0	Fe+2	1.8178			1.8178	0.0000				
CaO	13.341	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0	Ca+2	2.0339					2.0000	0.0339		
K ₂ O	0.858	Na+	0.0000					0.0000	0.0000	0.0000	
		K+	0.1569						0.1569	0.0000	
Total	99.999		Excess	T site	0.2478	C site	0.0000	B site	0.0339337	A site	0

Prefix	none	Total	8	Total	4.7404	Total	2.0000	Total	0.1569	Total	0.0000
Name	actinolite	%Fill	100		94.8083		100				
Modifier	none										
Group	Calcic Amphibole										

Sample # 041174-06-15367

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	2.00 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.16 Si > 7.5
Mg/(Mg+Fe2)	0.59 (Mg/(Mg+Fe2))< 0.9
Si	8.00

*X 'SQMTF'

SQMTF: QUANTIFY
Standardless Analysis

Refit _ALK', _ALK", _NAK' _NAK"
Refit _Si-K' _MgK' _K-K" _NAK
Chi-sqrd = 2.33

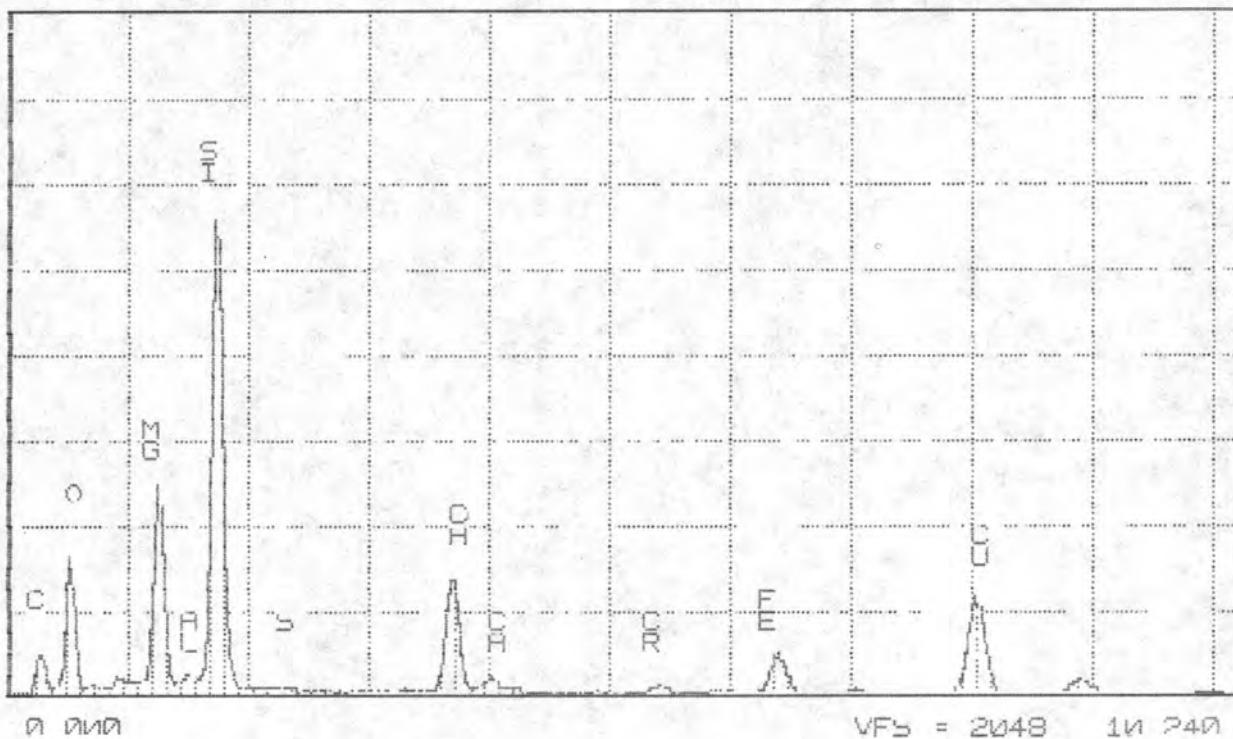
Element	Net Counts
Si-K	15766 +/- 175
Mg-K	6280 +/- 136
Al-K	278 +/- 70
K -K	105 +/- 32
Ca-K	4480 +/- 138
Fe-K	2101 +/- 98
Na-K	0 +/- 0

MARKS	EDS:SiK	EDS:MRK	FDS:ALK	FDS:K_K	EDS:CAK	FDS:FFK	FDS:
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041174-07 SP753

EL-LTNE	PEAK	K-FACTOR	CEL/CREF	ATOM%	EL WT%	WT%	FORMULA
SI-K	15766	1.000	1.0000	21.42	28.35	60.75	SiO ₂
MG-K	6280	1.000	0.398	10.05	11.24	18.82	MgO
AL-K	278	0.750	0.013	0.30	0.38	0.71	Al ₂ O ₃
K-K	105	1.000	0.007	0.11	0.20	0.24	K ₂ O
CA-K	4480	0.949	0.300	4.54	4.51	11.91	CaO
FE-K	2101	1.349	0.187	2.02	5.24	7.56	Fe ₂ O ₃
NA-K	0	0.549	0.000	0.00	0.00	0.00	Na ₂ O ₃
O			1.622	61.36	45.98		

TN-5500 University of Washington / JEOL S/N 14-NOV-04 21:21
Cursor: 0.000KeV = 0



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	60.75	Si+4	8.0000	8.0000							
Al ₂ O ₃	0.71	Al+3	0.1344	0.0000	0.1344						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	7.56	Fe+3	0.0212			0.0212	0.0000				
MgO	18.82	Mg+2	3.8481			3.8481	0.0000				
MnO	0	Fe+2	0.8765			0.8765	0.0000				
CaO	11.91	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0	Ca+2	1.7641					1.7641	0.0000		
K ₂ O	0.24	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0643						0.0643	0.0000	
Total	99.99		Excess	T site	0.1344	C site	0.0000	B site	0	A site	0

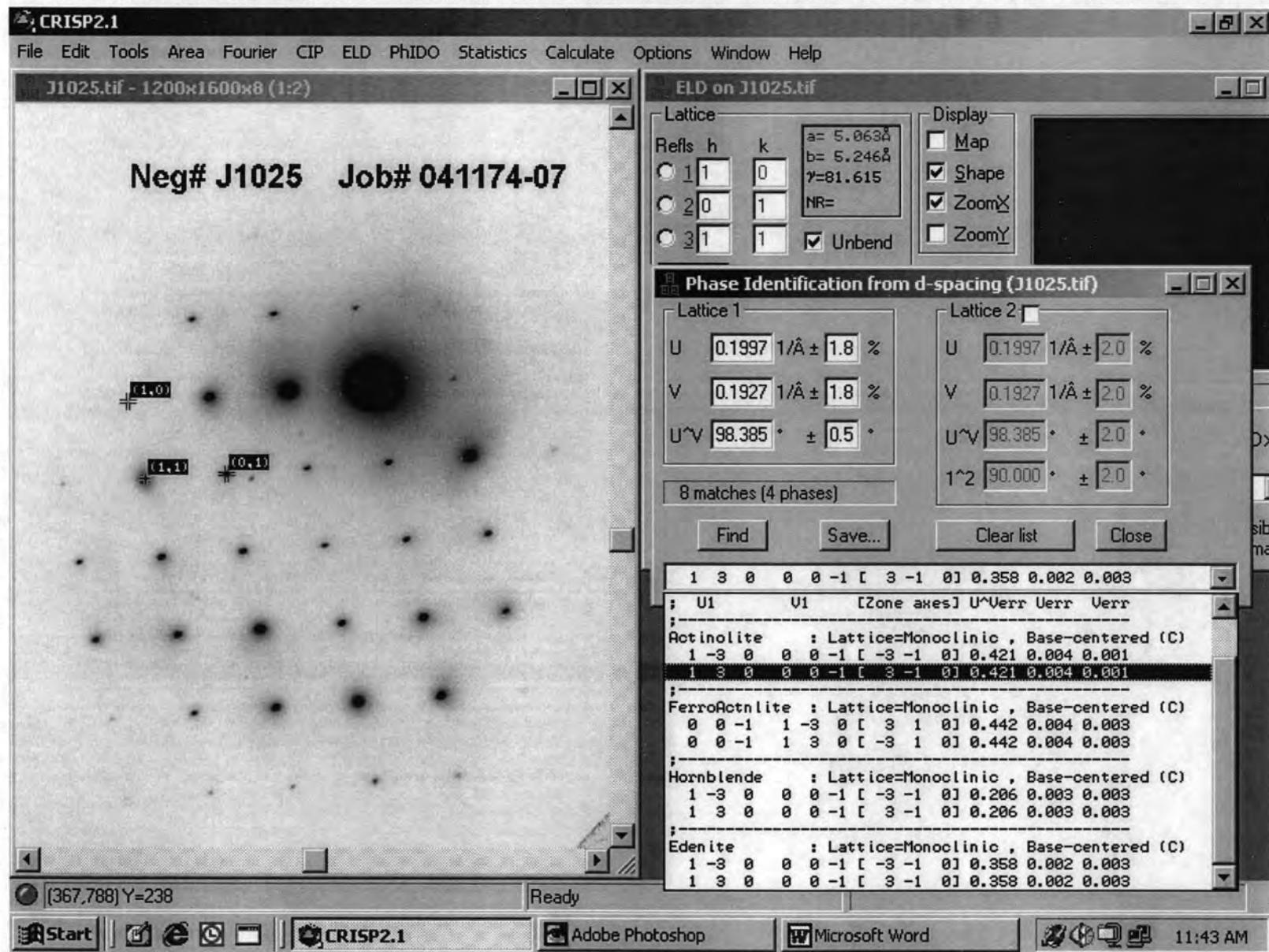
		Total	8	4.8801	1.7641	0.0643	0.0000
Prefix	none	%Fill	100	97.6019	88.2061		
Name	actinolite						
Modifier	none						
Group	Calcic Amphibole						

Sample # 041174-07-753

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.76 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.76 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.06 Si > 7.5
Mg/(Mg+Fe2)	0.81 (Mg/(Mg+Fe2))< 0.9
Si	8.00

ACTINOLITE

[3 -1 0]



SQMTE: QUANTIFY
Standardless Analysis

Refit _NAK' _NAK"
 Refit _MGK' _ALK' _ALK" _K_K" _FEK" _NAK
 Refit _MGK"
 Chi-sqrd = 2.75

Element	Net Counts		
Si-K	5033	+/-	103
Mg-K	2012	+/-	46
Al-K	381	+/-	38
K-K	64	+/-	22
Ca-K	1470	+/-	82
Fe-K	1491	+/-	56
Na-K	0	+/-	0

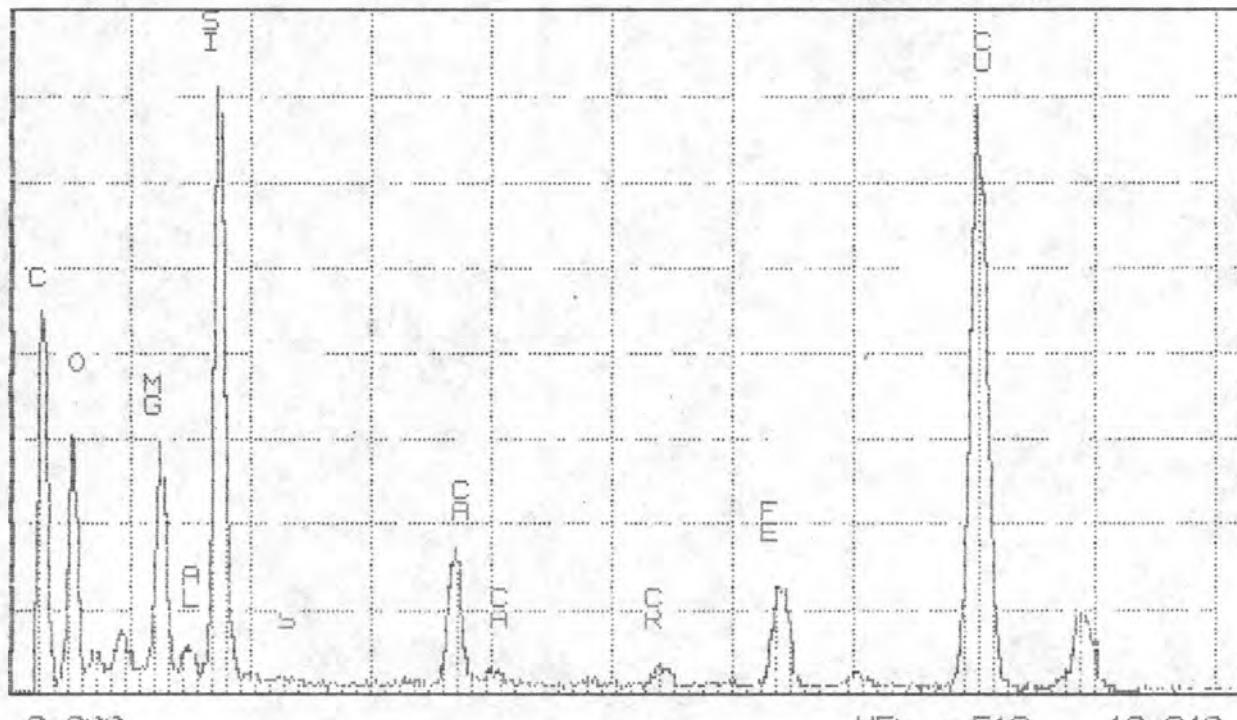
EDS:SiK EDS:MGK EDS:ALK EDS:K_K EDS:CAK EDS:FEK EDS:

041174-07 SP/54

EL-LINE	PEAK	K-FACTOR	CEL/CREF	ATOM%	EL W%	W%	FORMULA
SI-K	5033	1.000	1.000	19.49	25.55	54.74	SiO2
MG-K	2012	1.000	0.400	9.33	10.21	17.02	MgO
AL-K	381	0.750	0.057	1.18	1.45	2.74	Al2O3
K-K	64	1.000	0.014	0.20	0.35	0.42	K2O
CA-K	1470	0.949	0.278	3.88	7.09	9.93	CaO
FE-K	1491	1.399	0.415	4.15	10.60	15.14	Fe2O3
NA-K	0	0.549	0.000	0.00	0.00	0.00	Na2H3
O			1.752	61.28	44.75		

TN-5500 University of Washington / JEOL SUN 14-NOV-04 21:59

Cutoff: 0.000keV = 0



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	54.74	Si+4	7.6104	7.6104							
Al ₂ O ₃	2.74	Al+3	0.4489	0.3896	0.0594						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	15.14	Fe+3	0.7761			0.7761	0.0000				
MgO	17.02	Mg+2	3.5277			3.5277	0.0000				
MnO	0	Fe+2	0.8976			0.6369	0.2608				
CaO	9.93	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0	Ca+2	1.4790					1.4790	0.0000		
K ₂ O	0.42	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0745							0.0745	0.0000
Total	99.99		Excess	T site	0.0594	C site	0.2608	B site	0	A site	0

Prefix	none	Total	8	5.0000	1.4790	0.0745	0.0000
		%Fill	100	100	73.9513		

Name probable actinolite Ca values below optimal levels

Modifier Ferrian

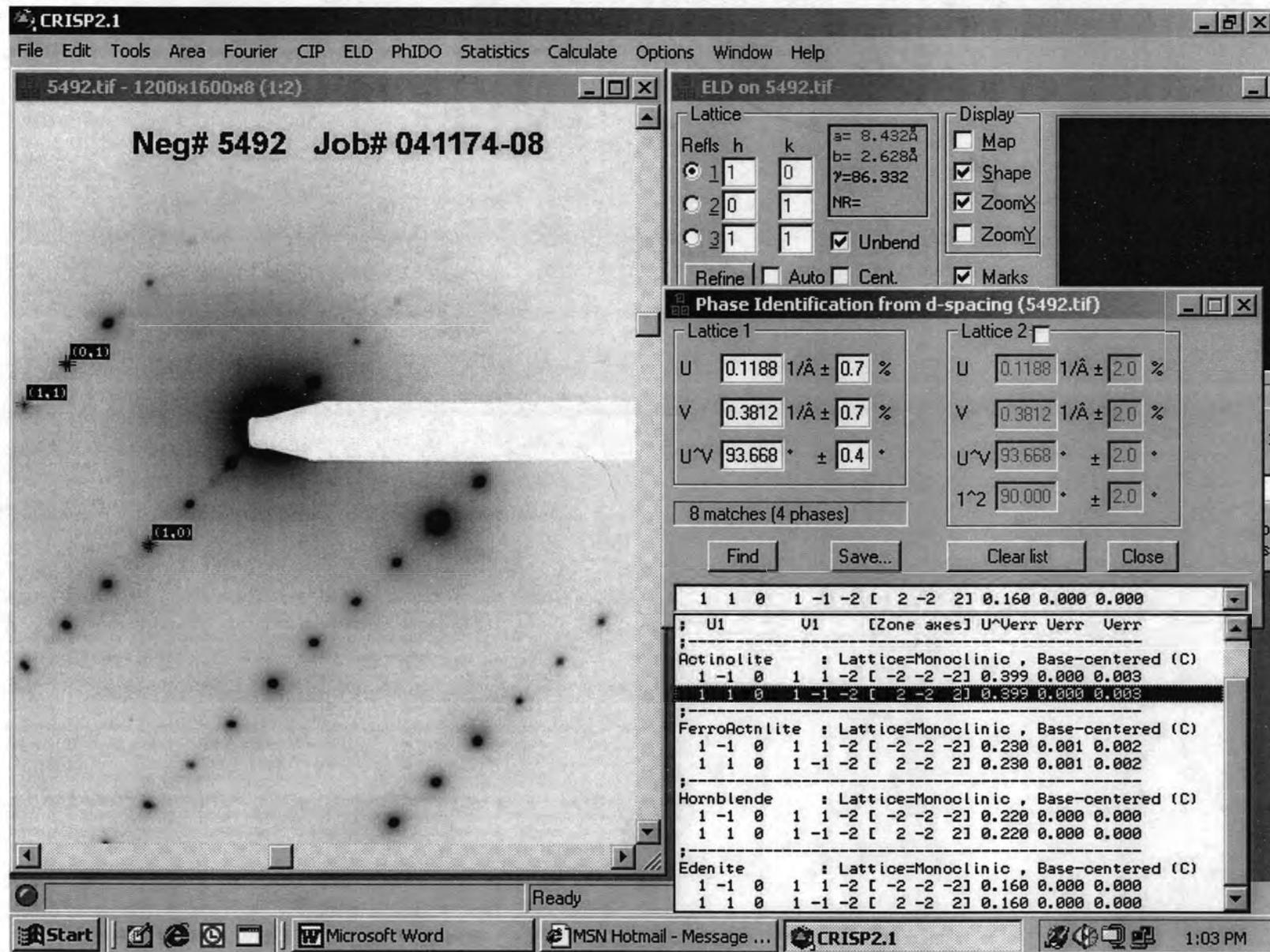
Group Calcic Amphibole

Sample # 041174-07-754

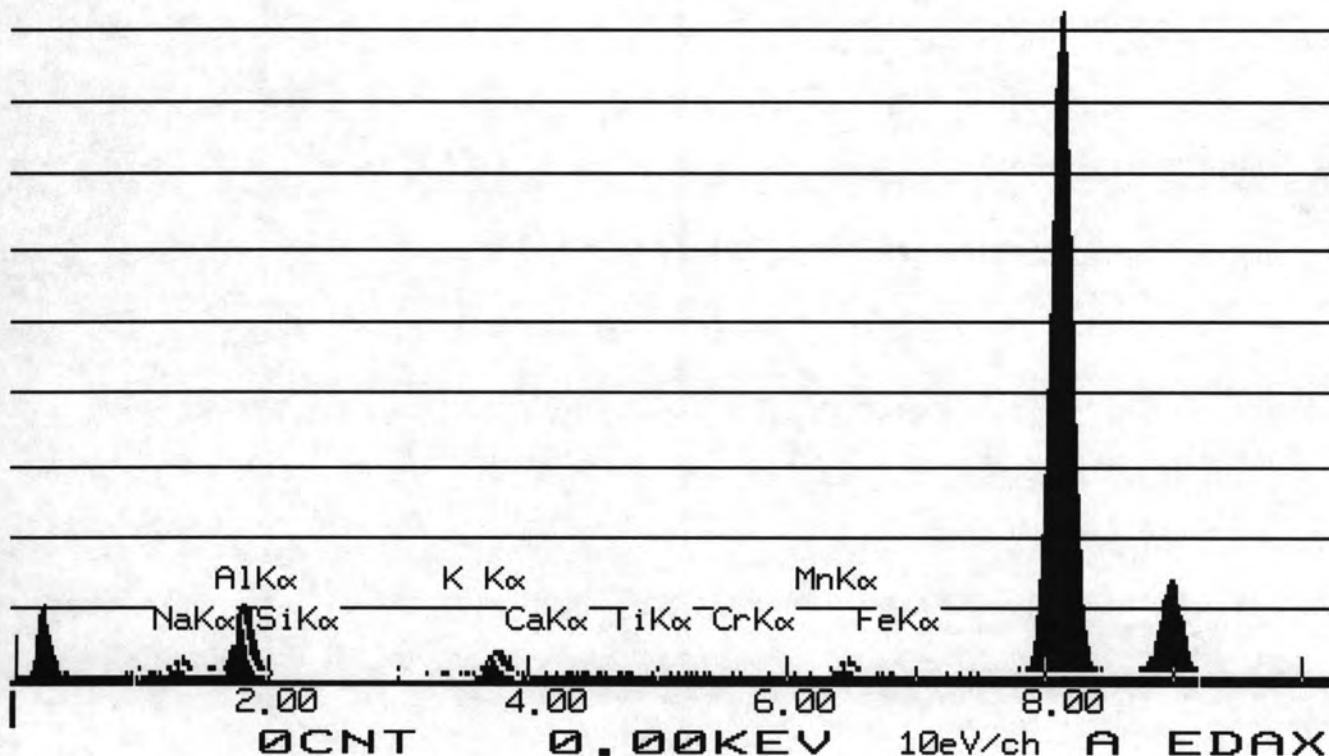
<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.48 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 1 < Ca@B < 1.5 and (Na,K)@A < 0.5
Ca@B	1.48 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.07 Si > 7.5
Mg/(Mg+Fe2)	0.80 (Mg/(Mg+Fe2))< 0.9
Si	7.61

ACTINOLITE

[1 -1 1]



22-NOV-04 22:53:22 SUPER QUANT
RATE = 0CPS TIME = 25LSEC
FS = 2627/ 2627 PRST = 200LSEC
A = 041174-08 SP 15369



INTE-% :
LABEL = 041174-08 SP 15369
23-NOV-72 22:55:48
25.605 LIVE SECONDS

ELEM	WT %	WT %
ELEM	CPS	OXIDE
MGK	14.763	8.023
ALK	3.866	1.262
SIK	91.349	27.921
CAK	34.641	10.095
MNK	0.781	0.328
FEK	18.121	7.015

TOTAL		100.000

USED PEIF: USER

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	59.733	Si+4	8.0000	8.0000							
Al ₂ O ₃	2.385	Al+3	0.4064	0.0000	0.4064						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	10.03	Fe+3	0.0233			0.0233	0.0000				
MgO	13.303	Mg+2	2.7757			2.7757	0.0000				
MnO	0.424	Fe+2	1.1694			1.1694	0.0000				
CaO	14.125	Mn+2	0.0784			0.0784	0.0000				
Na ₂ O	0	Ca+2	2.1156				2.0000	0.1156			
K ₂ O	0	Na+	0.0000				0.0000	0.0000	0.0000	0.0000	
		K+	0.0000						0.0000	0.0000	
Total	100		Excess	T site	0.4064	C site	0.0000	B site	0.1156312	A site	0

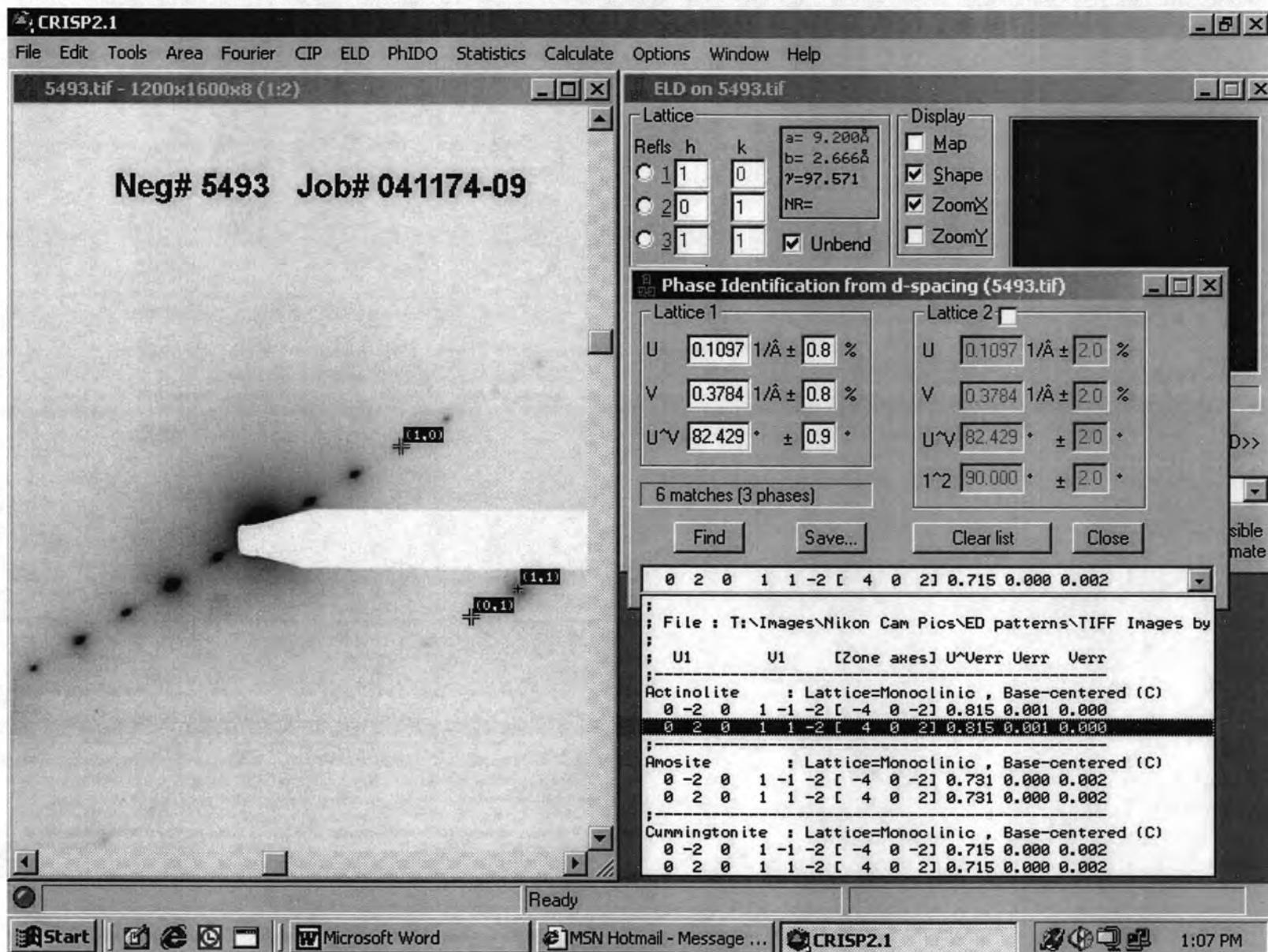
Prefix	none	Total	8	Total	4.4531	Total	2.0000	Total	0.0000	Total	0.0000
Name	actinolite	%Fill	100		89.0616		100				

Modifier none
 Group Calcic Amphibole

Sample # 041174-08-15369

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	2.00 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.70 (Mg/(Mg+Fe2))< 0.9
Si	8.00

ACTINOLITE
[2 0 1]



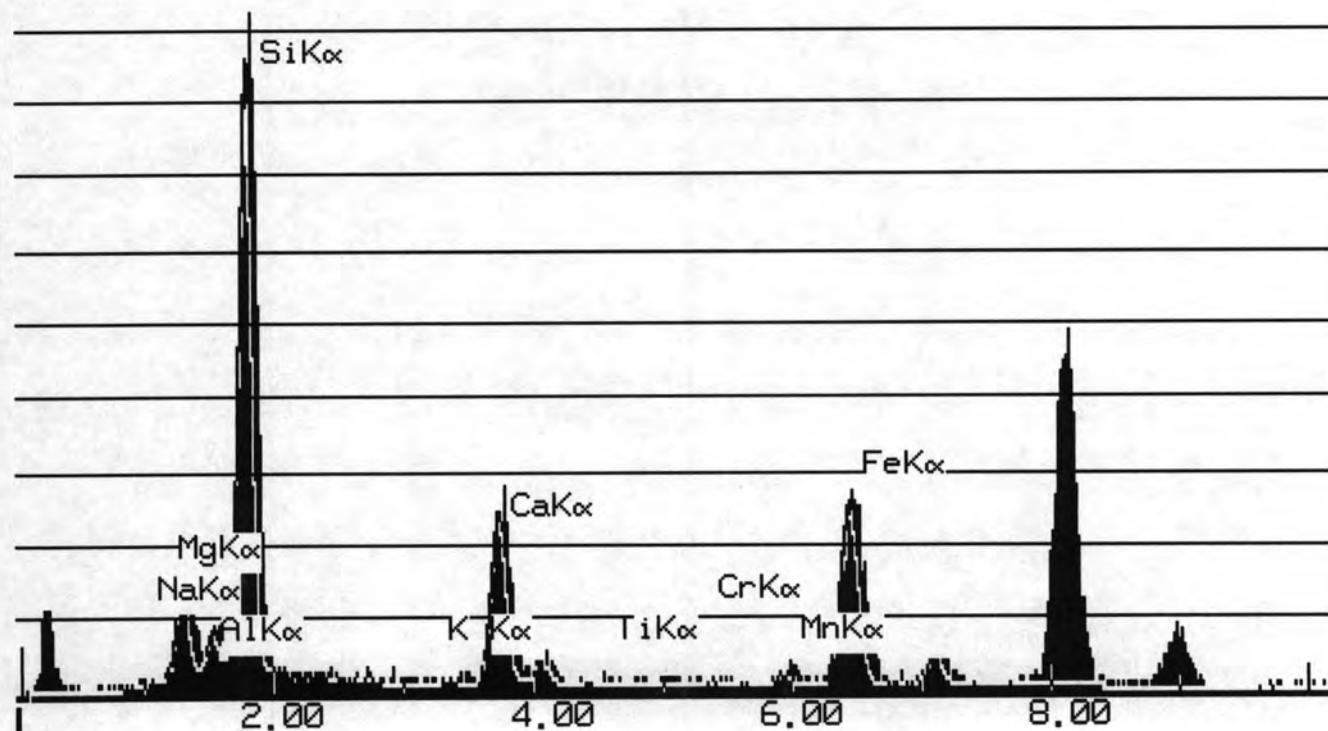
INTE-% :
LABEL = 041174-09 SP 15370
23-NOV-72 21:24:55
31.119 LIVE SECONDS

ELEM	CPS	WT %	WT %
		ELEM	OXIDE
MGK	34.802	7.067	11.717
ALK	13.272	1.619	3.059
SIK	222.954	25.461	54.470
K K	1.928	0.366	0.441
CAK	71.404	7.774	10.878
TIK	1.028	0.158	0.263
CRK	0.482	0.073	0.107
MNK	5.174	0.813	1.049
FEK	87.119	12.601	18.016

TOTAL		100.000	

USED PEIF: USER

22-NOV-04 21:25:21 SUPER QUANT
RATE= 0CPS TIME= 31LSEC
FS= 813/ 813 PRST= 200LSEC
A =041174-09 SP 15370



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	54.47	Si+4	7.7578	7.7578							
Al2O3	3.059	Al+3	0.5134	0.2422	0.2712						
TiO2	0.263	Ti+4	0.0282	0.0000	0.0282						
Cr2O3	0.107	Cr+3	0.0120			0.0120	0.0000				
Fe(total)O	18.016	Fe+3	0.4634			0.4634	0.0000				
MgO	11.717	Mg+2	2.4878			2.4878	0.0000				
MnO	1.049	Fe+2	1.6306			1.6306	0.0000				
CaO	10.878	Mn+2	0.1265			0.1067	0.0198				
Na2O	0	Ca+2	1.6598					1.6598	0.0000		
K2O	0.441	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0801							0.0801	0.0000
Total	100		Excess	T site	0.2994	C site	0.0198	B site	0	A site	0

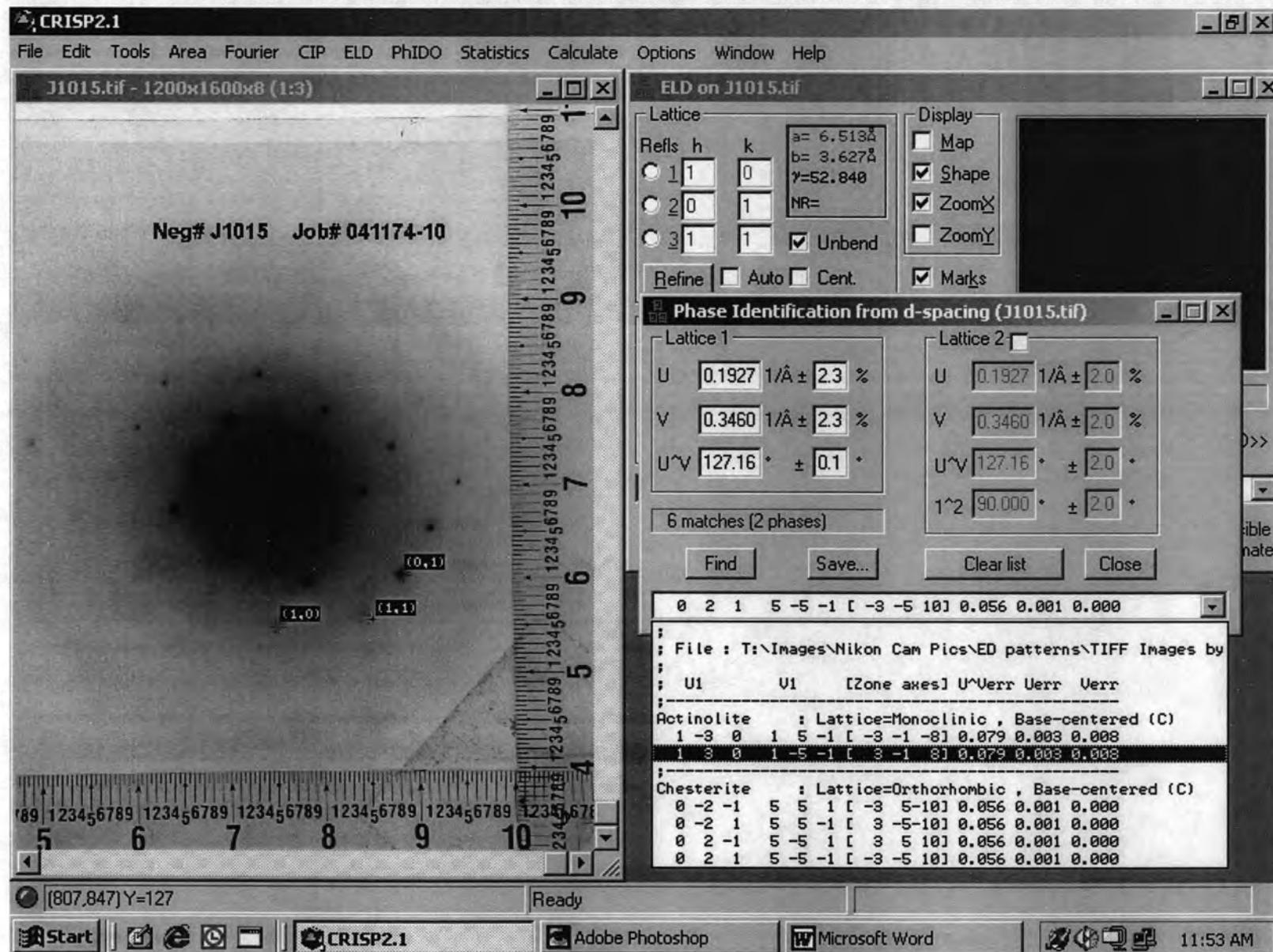
		Total	8		5.0000		1.6598		0.0801	0.0000
Prefix	none	%Fill	100		100		82.989			
Name	actinolite									
Modifier	none									
Group	Calcic Amphibole									

Sample # 041174-09-15370

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.66 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.66 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.08 Si > 7.5
Mg/(Mg+Fe2)	0.60 (Mg/(Mg+Fe2))< 0.9
Si	7.76

ACTINOLITE

[3 -1 8]



SQMTF: QUANTIFY
Standardless Analysis

Refit _ALK' _ALK" _K_K' _K_K" _NAK' _NAK"
Refit _NAK
Chi-sqd = 1.82

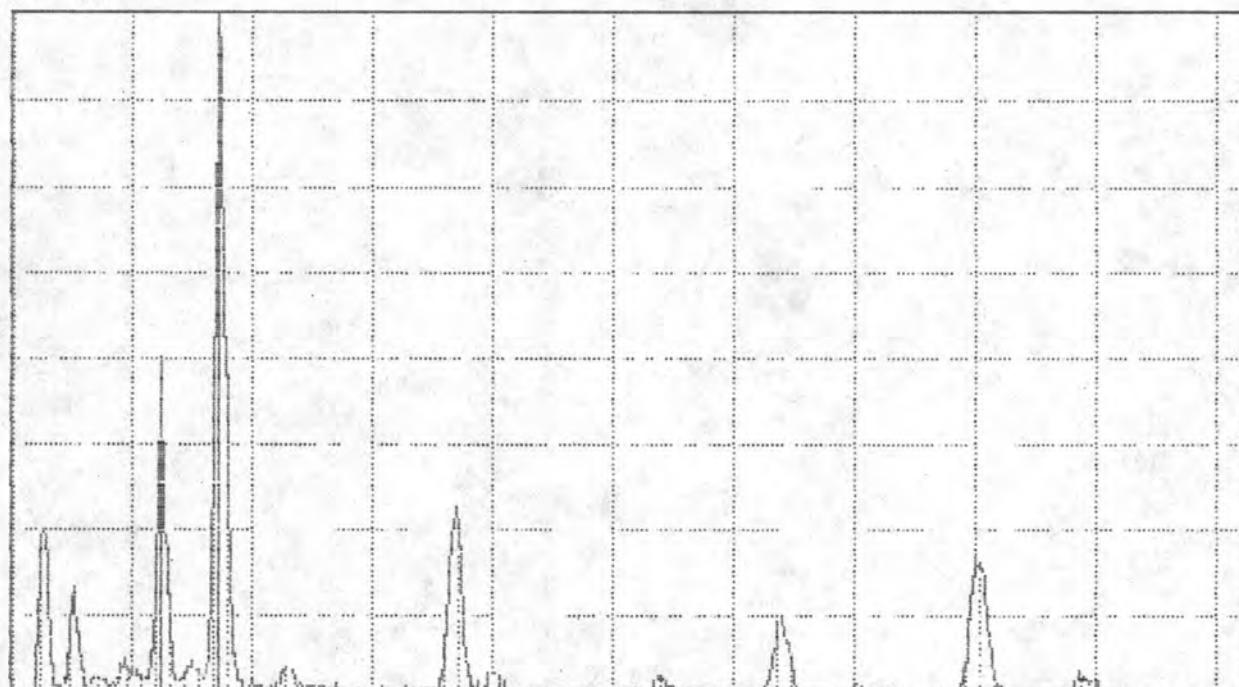
Element	Net Counts	
Si-K	5372	+/- 105
Mg-K	1950	+/- 84
Al-K	126	+/- 48
K-K	41	+/- 20
Ca-K	1936	+/- 87
Fe-K	872	+/- 67
Na-K	0	+/- 0

REMARKS	EDS:SiK	EDS:MGK	EDS:ALK	EDS:K_K	EDS:CAK	FTS:FEK	EDS:
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041174-10 SP744

EL-LINE	PEAK	K-FACTOR	CEL/CREF	ATOM%	FI	WT%	WT%	FORMULA
SI-K	5372	1.000	1.000	21.43	27.81	59.40	51.02	
MG-K	1950	1.000	0.363	9.08	10.10	16.83	16.83	MGO
AL-K	126	0.750	0.018	0.39	0.49	0.93	0.93	AL2O3
K-K	41	1.000	0.008	0.13	0.23	0.27	0.27	K2O
CA-K	1936	0.949	0.342	5.14	4.52	13.33	13.33	CAO
FE-K	872	1.349	0.227	2.44	6.32	9.03	9.03	FF2114
NA-K	0	0.549	0.000	0.00	0.00	0.00	0.00	NA2O3
O			1.617	41.39	45.52			

TN-5500 University of Washington / JIFOL SAT 13-NOV-04 11:35
Cursor: 1.730KeV = 47Y



0 000 MG-12 VFS = 512 10.240
71 041174-10 SP744

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	59.6	Si+4	8.0000	8.0000							
Al ₂ O ₃	0.93	Al+3	0.1659	0.0000	0.1659						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	9.03	Fe+3	0.0194			0.0194	0.0000				
MgO	16.83	Mg+2	3.4758			3.4758	0.0000				
MnO	0	Fe+2	1.0461			1.0461	0.0000				
CaO	13.33	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0	Ca+2	1.9843				1.9843	0.0000			
K ₂ O	0.27	Na+	0.0000				0.0000	0.0000	0.0000	0.0000	
		K+	0.0643						0.0643	0.0000	
Total	99.99		Excess	T site	0.1659	C site	0.0000	B site	0	A site	0

Prefix	none	Total	8	4.7072	1.9843	0.0643	0.0000
Name	actinolite	%Fill	100	94.1441	99.2155		

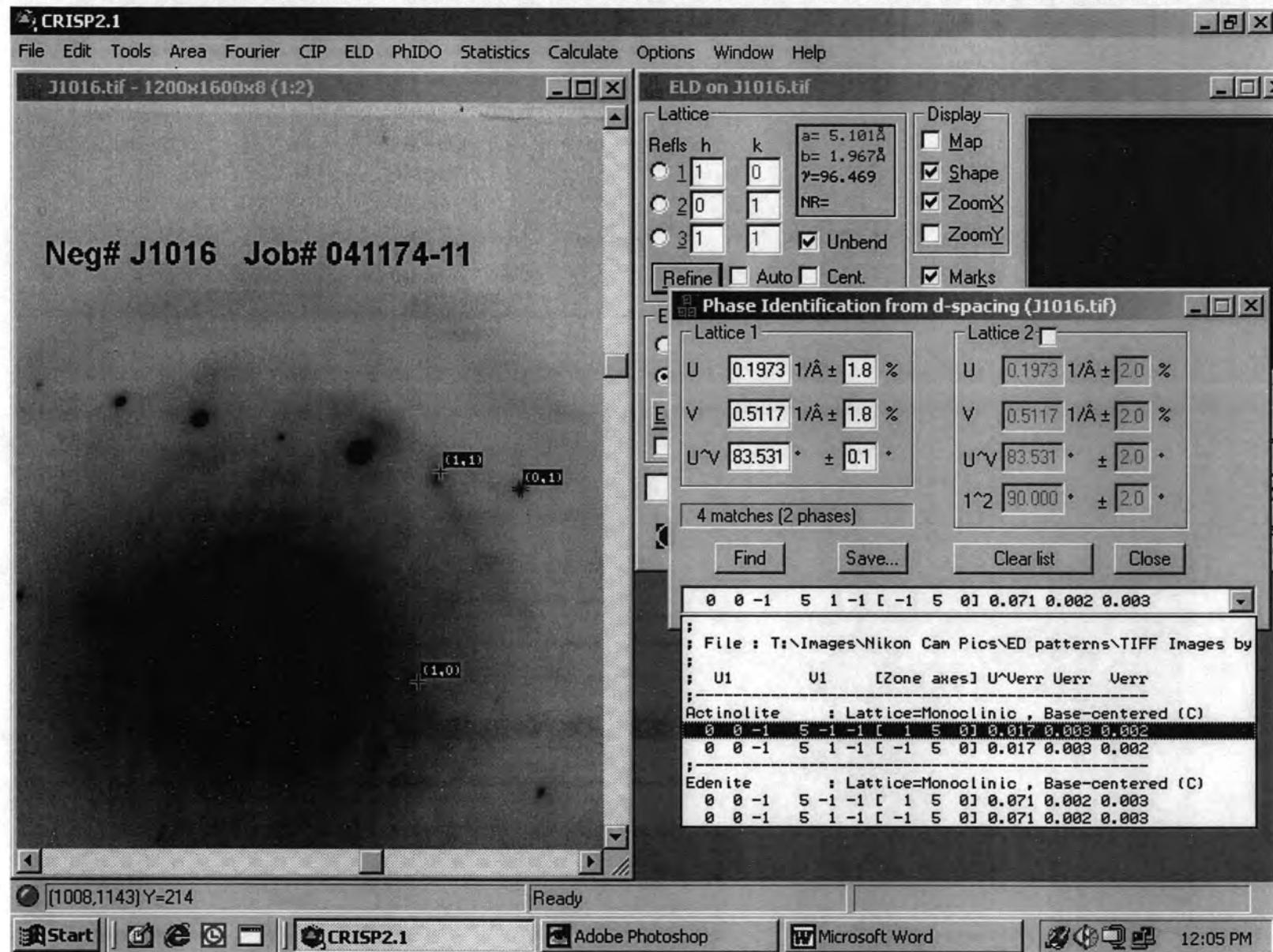
Modifier none
 Group Calcic Amphibole

Sample # 041174-10-744

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.98 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.98 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.06 Si > 7.5
Mg/(Mg+Fe2)	0.77 (Mg/(Mg+Fe2))< 0.9
Si	8.00

ACTINOLITE

[1 5 0]



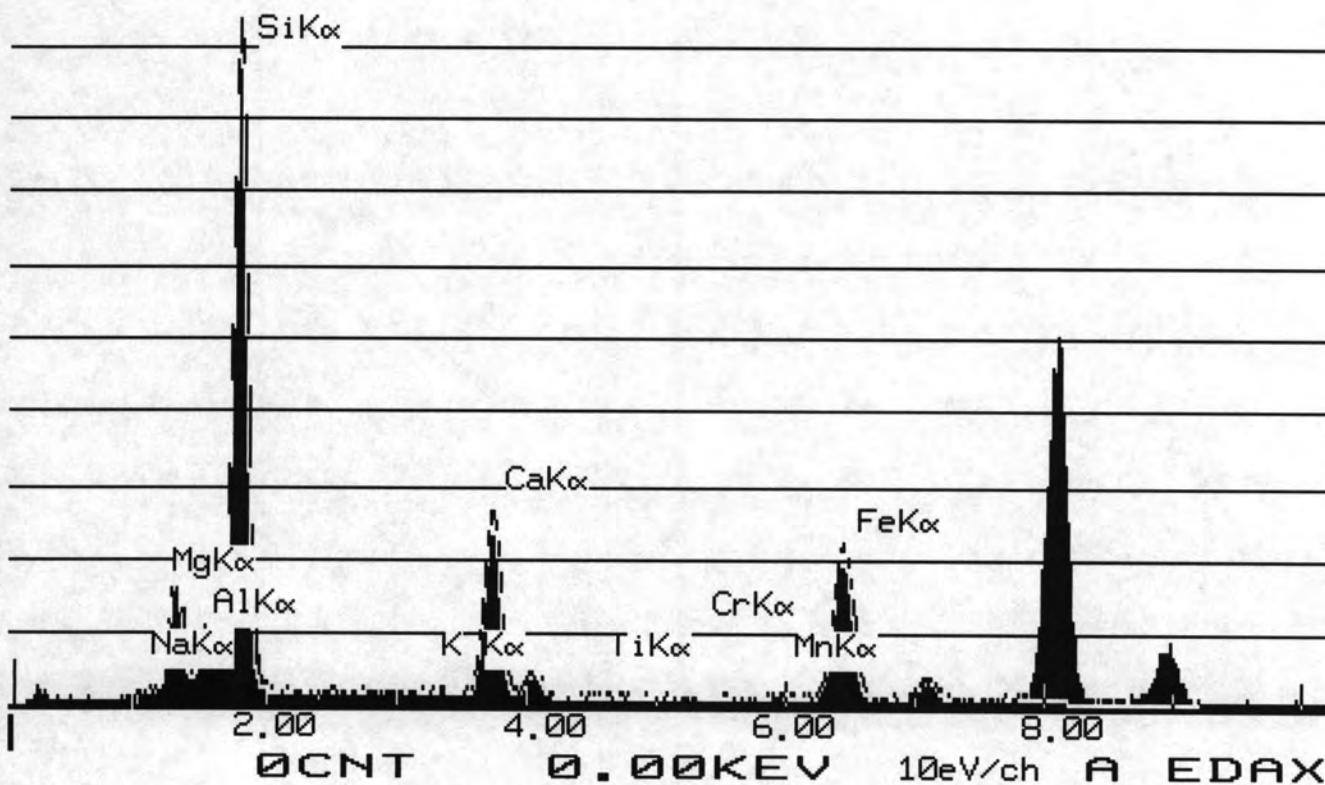
INTE-% :
LABEL = 041174-11 SP 15508
05-DEC-72 19:11:56
40.265 LIVE SECONDS

ELEM	CPS	WT %	WT %
		ELEM	OXIDE
MGK	42.890	8.031	13.316
ALK	22.724	2.556	4.829
SIK	244.701	25.769	55.128
K K	1.987	0.348	0.419
CAK	80.640	8.096	11.328
TIK	0.546	0.077	0.129
MNK	1.540	0.223	0.288
FEK	76.368	10.186	14.563

TOTAL		100.000	

USED PEIF: USER

04-DEC-04 19:12:34 SUPER QUANT
RATE= 7CPS TIME= 40LSEC
FS= 1039/ 1039 PRST= 200LSEC
A =041174-11 SP 15508



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	55.128	Si+4	7.7172	7.7172							
Al ₂ O ₃	4.829	Al+3	0.7967	0.2828	0.5138						
TiO ₂	0.129	Ti+4	0.0136	0.0000	0.0136						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	14.563	Fe+3	0.2301			0.2301	0.0000				
MgO	13.316	Mg+2	2.7790			2.7790	0.0000				
MnO	0.288	Fe+2	1.4490			1.4490	0.0000				
CaO	11.328	Mn+2	0.0341			0.0146	0.0196				
Na ₂ O	0	Ca+2	1.6989				1.6989	0.0000			
K ₂ O	0.419	Na+	0.0000				0.0000	0.0000	0.0000	0.0000	
		K+	0.0748						0.0748	0.0000	
Total	100		Excess	T site	0.5274	C site	0.0196	B site	0	A site	0

Prefix	none	Total	8	Total	5.0000	Total	1.6989	Total	0.0748	Total	0.0000
Name	actinolite	%Fill	100		100		84.9436				

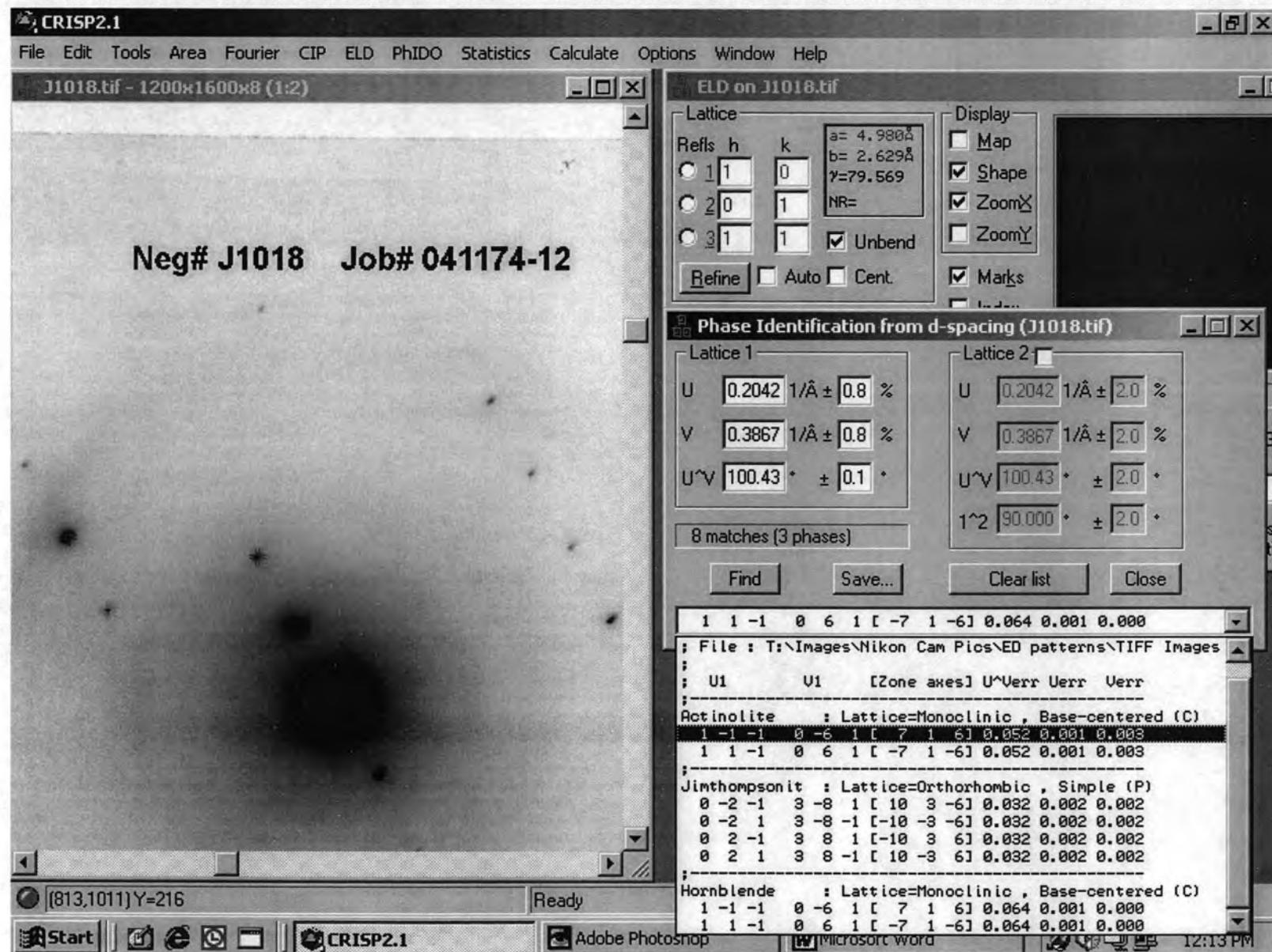
Modifier none
 Group Calcic Amphibole

Sample # 041174-11-15508

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.70 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.70 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.07 Si > 7.5
Mg/(Mg+Fe2)	0.66 (Mg/(Mg+Fe2))< 0.9
Si	7.72

ACTINOLITE

[716]



SWMTF: QUANTIFY
Standardless Analysis

Refit _K K' _K K"
Refit _ALK' _ALK" _K K _NAK'
Chi-sqd = 2.82

Element	Net Counts	
Si-K	11717	+/- 152
Mg-K	3936	+/- 141
Al-K	469	+/- 71
K -K	0	+/- 0
Ca-K	4030	+/- 120
Fe-K	2711	+/- 102
Na-K	192	+/- 72

REMARKS EDS:SiK EDS:MgK EDS:ALK EDS:K K EDS:CAK EDS:FEK EDS:

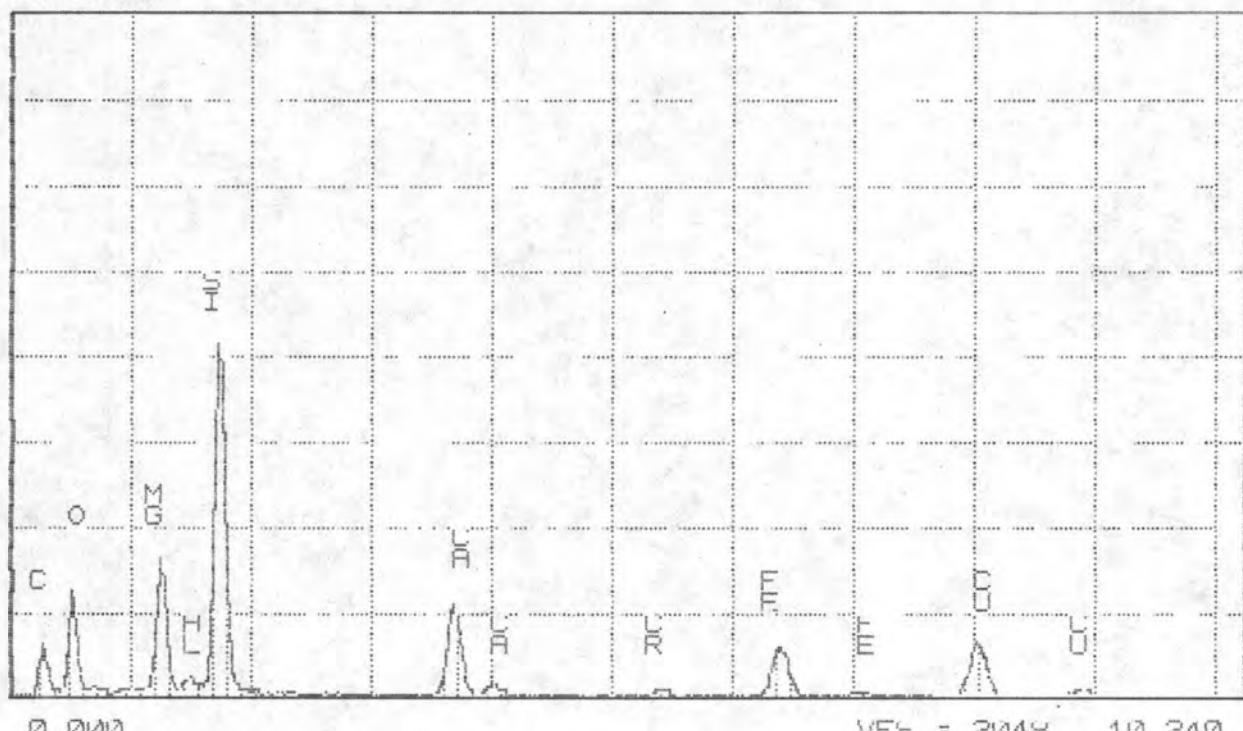
041174-12 SP746

EL-LINE	PEAK	K-FACTOR	CEL/CREF	A111M%	FI	WT%	FORMULA
Si-K	11717	1.000	1.000	21.05	27.04	57.94	SiO2
Mg-K	3936	1.000	0.334	8.25	9.08	15.14	MgO
Al-K	469	0.750	0.030	0.64	0.81	1.53	Al2O3
K -K	0	1.060	0.000	0.00	0.00	0.00	K2O
Ca-K	4030	0.949	0.327	4.81	8.84	12.37	CaO
Fe-K	2711	1.399	0.324	3.41	8.76	17.51	FE2O3
Na-K	192	0.549	0.009	0.23	0.24	0.50	NA2U3
O			1.672	61.60	45.22		

1,80

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TN-5500 University of Washington / JEOL SHI 13-NOV-04 15:05
Cursor: 0.000KeV = 0



	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	57.94	Si+4	8.0000	8.0000							
Al ₂ O ₃	1.53	Al+3	0.2564	0.0000	0.2564						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	12.51	Fe+3	0.0167			0.0167	0.0000				
MgO	15.14	Mg+2	3.1531			3.1531	0.0000				
MnO	0	Fe+2	1.4482			1.4482	0.0000				
CaO	12.37	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0.5	Ca+2	1.8532					1.8532	0.0000		
K ₂ O	0	Na+	0.1487					0.1468	0.0019	0.0019	0.0000
		K+	0.0000						0.0000	0.0000	
Total	99.99		Excess	T site	0.2564	C site	0.0000	B site	0.0019163	A site	0

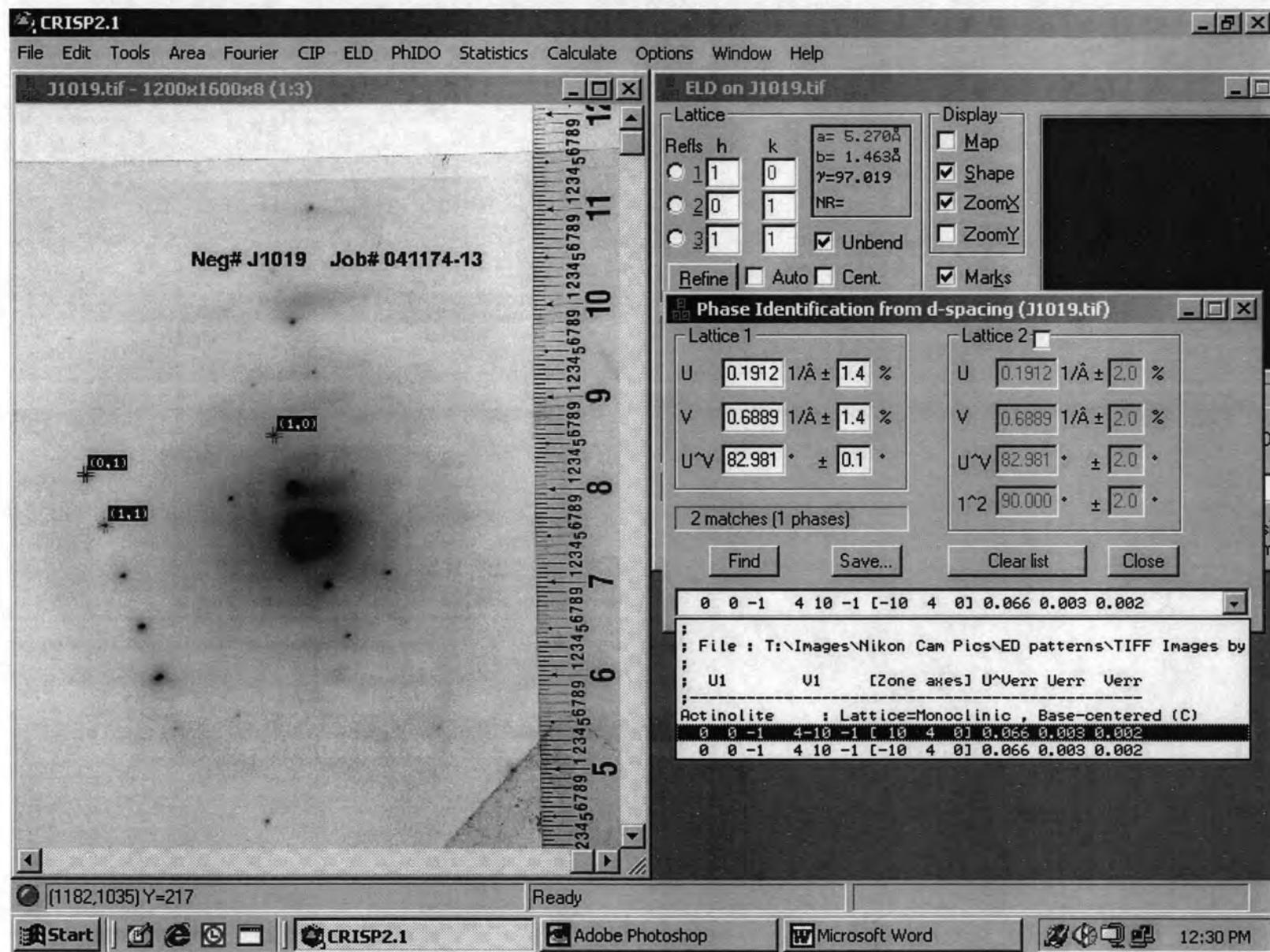
Prefix	none	Total	8	4.8744	2.0000	0.0019	0.0000
Name	actinolite	%Fill	100	97.4875	100		
Modifier	none						
Group	Calcic Amphibole						

Sample # 041174-12-746

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.15 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.85 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.69 (Mg/(Mg+Fe2))< 0.9
Si	8.00

ACTINOLITE

[5 2 0]



*X 'SWMTF'
SWMTF: QUANTITY
Standardless Analysis

Refit _K-K' _K-K'' _NAK' _NAK''
Refit _ALK' _ALK'' _K-K' _NAK
Chi-sqrd = 2.67

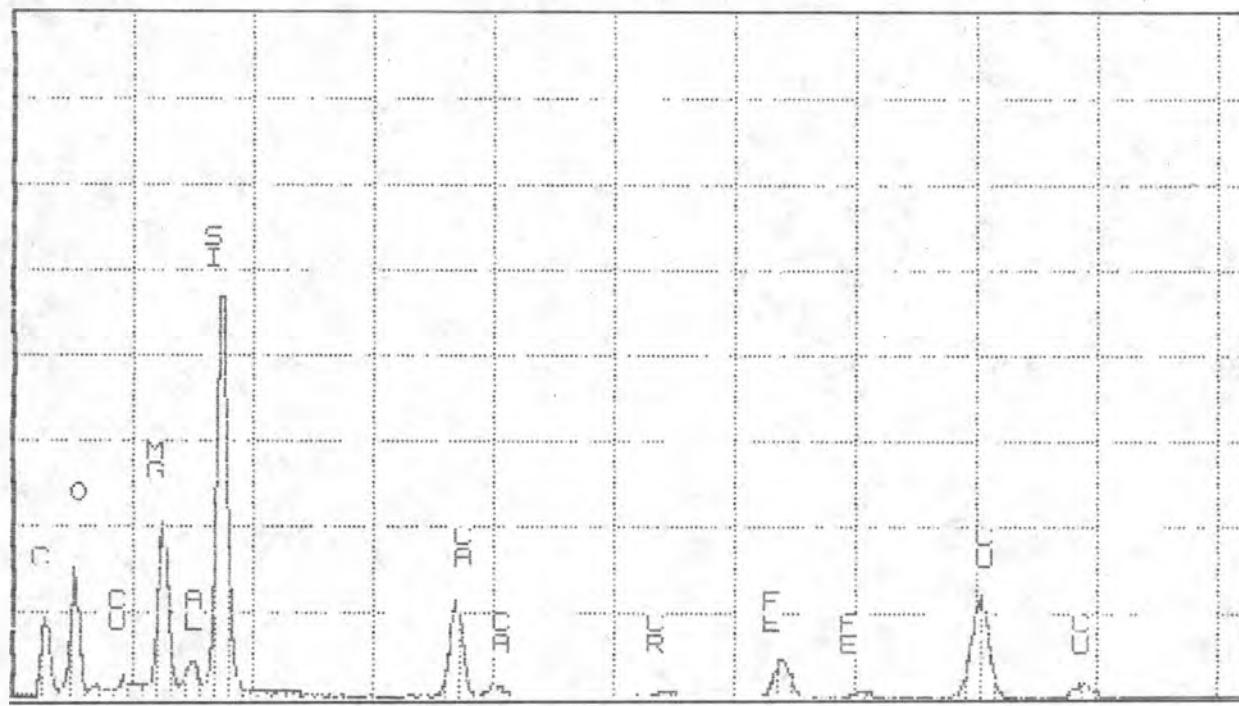
Element	Net Counts	
Si-K	13027	+/- 167
Mg-K	5117	+/- 134
Al-K	858	+/- 81
K-K	0	+/- 0
Ca-K	3858	+/- 120
Fe-K	1930	+/- 98
Na-K	0	+/- 0

REMARKS	EDS:SiK	EDS:MgK	EDS:ALK	EDS:K-K	EDS:CAK	EDS:FEK	EDS:
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041174-13 SP747

EL-LINE	PEAK	K-FACTOR	CEL/CREF	ATOM%	EL WT%	WT%	FORMULA
SI-K	13027	1.000	1.000	21.24	27.92	59.84	SiO2
MG-K	5117	1.000	0.343	9.75	10.97	18.28	MgO
AL-K	858	0.750	0.049	1.09	1.38	2.61	Al2O3
K-K	0	1.000	0.000	0.00	0.00	0.00	K2O
CA-K	3858	0.949	0.281	4.19	7.86	11.00	CaO
FE-K	1930	1.349	0.207	2.21	5.79	8.27	Fe2O3
NA-K	0	0.549	0.000	0.00	0.00	0.00	Na2O3
O			1.450	61.47	46.08		

TN-5500 University of Washington / JEOL SAT 13-NOV-04 17:06
Cursor#: 0 ENERGY = 0



0.000

VFS = 2048 10 240

39

041174-13 SP747

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	59.84	Si+4	8.0000	8.0000							
Al ₂ O ₃	2.61	Al+3	0.4187	0.0000	0.4187						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	8.27	Fe+3	0.2961			0.2961	0.0000				
MgO	18.28	Mg+2	3.6767			3.6767	0.0000				
MnO	0	Fe+2	0.6117			0.6084	0.0032				
CaO	11	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0	Ca+2	1.5937					1.5937	0.0000		
K ₂ O	0	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0000						0.0000	0.0000	
Total	100		Excess	T site	0.4187	C site	0.0032	B site	0	A site	0

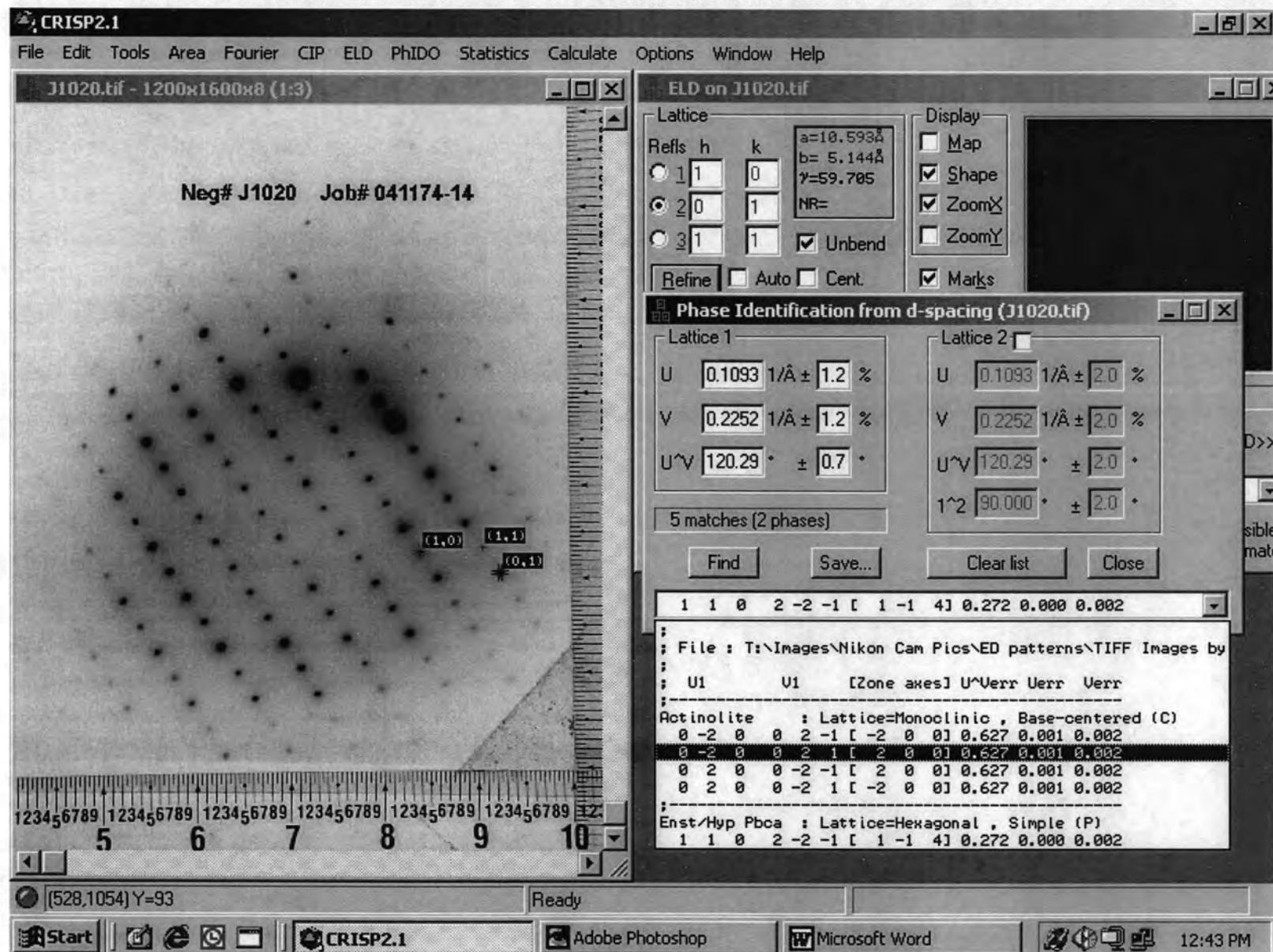
		Total	8	5.0000	1.5937	0.0000	0.0000
Prefix	none	%Fill	100	100	79.6849		
Name	actinolite						
Modifier	none						
Group	Calcic Amphibole						

Sample # 041174-13-747

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.59 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.59 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.86 (Mg/(Mg+Fe2))< 0.9
Si	8.00

ACTINOLITE

[2 0 0]



ELD on J1020.tif

Lattice

Refls h k
 1 1 0
 2 0 1
 3 1 1
a=10.5935
b= 5.1448
 $\gamma=59.705$
NR=
 Unbend

Display

Map
 Shape
 ZoomX
 ZoomY
 Marks

Phase Identification from d-spacing (J1020.tif)

Lattice 1

U 0.1093 1/ \AA ± 1.2 %
V 0.2252 1/ \AA ± 1.2 %
U \wedge V 120.29 ° ± 0.7 °

5 matches (2 phases)

Find

Save...

Clear list

Close

Lattice 2

U 0.1093 1/ \AA ± 2.0 %
V 0.2252 1/ \AA ± 2.0 %
U \wedge V 120.29 ° ± 2.0 °
1 \wedge 2 90.000 ° ± 2.0 °

1 1 0 2 -2 -1 [1 -1 4] 0.272 0.000 0.002

;
: File : T:\Images\Nikon Cam Pics\ED patterns\TIFF Images by
:
: U1 V1 [Zone axes] U \wedge Verr Uerr Verr
:-
Actinolite : Lattice=Monoclinic , Base-centered (C)
0 -2 0 0 2 -1 [-2 0 0] 0.627 0.001 0.002
0 -2 0 0 2 1 [2 0 0] 0.627 0.001 0.002
0 2 0 0 -2 -1 [2 0 0] 0.627 0.001 0.002
0 2 0 0 -2 1 [-2 0 0] 0.627 0.001 0.002
:-
Enst/Hyp Pbca : Lattice=Hexagonal , Simple (P)
1 1 0 2 -2 -1 [1 -1 4] 0.272 0.000 0.002

123456789 123456789 123456789 123456789 123456789 123456789

5 6 7 8 9 10



(528,1054) Y=93

Ready

Start



CRISP2.1

Adobe Photoshop

Microsoft Word



12:43 PM

*
** /HQMTF *

SUMTF: QUANTIFY
Standardless Analysis

Refit _K_K' _K_K"

Refit _SiK' _ALK"

Chi-sqrd = 2.05

Element	Net Counts	
Si-K	4803	+/- 111
Mg-K	1669	+/- 125
Al-K	450	+/- 52
K-K'	37	+/- 19
Ca-K	1536	+/- 77
Fe-K	1411	+/- 73
Na-K	228	+/- 68

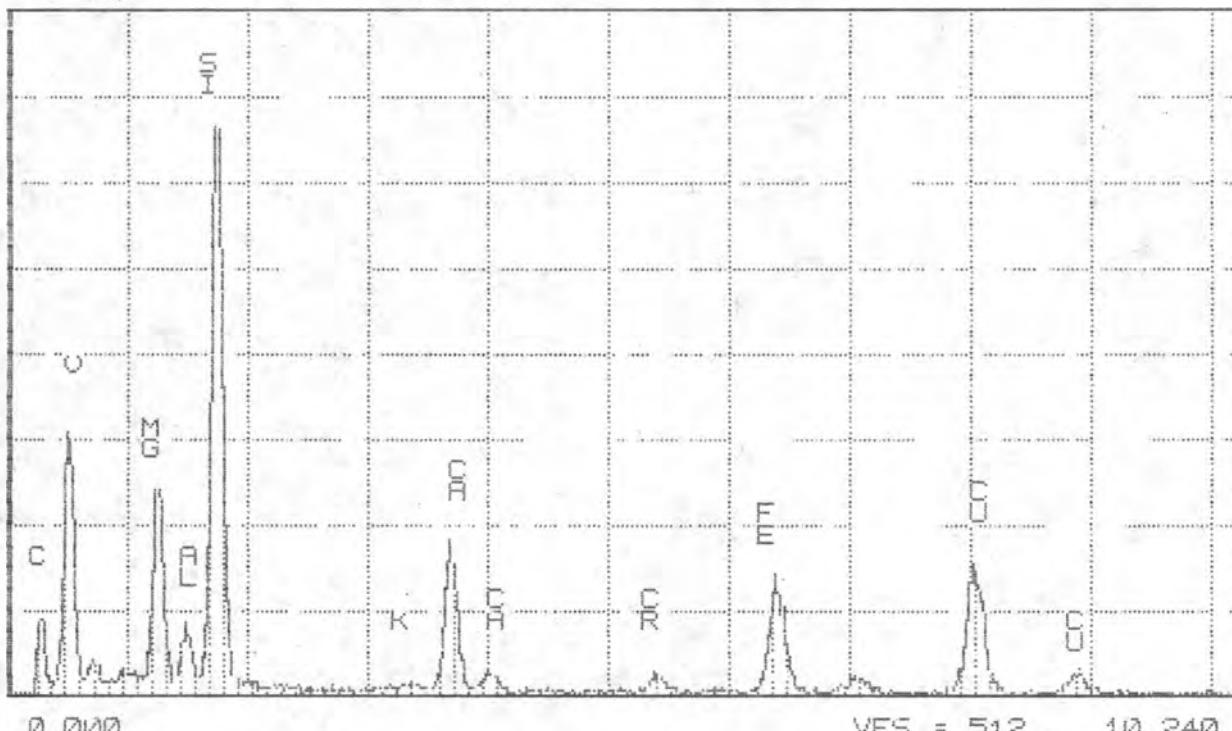
NREF.S EDS:SiK EDS:MGK EDS:ALK EDS:K_K EDS:CAK EDS:FEK EDS:

041174-14 SP748

EL-LINE	PEAK	K-FACTOR	CFL/CREF	ATOM%	EL Wt%	WT%	FORMULA
Si-K	4803	1.000	1.000	19.91	25.43	54.50	SiO ₂
Mg-K	1669	1.000	0.348	8.08	8.84	14.73	MgO
Al-K	450	0.750	0.070	1.45	1.79	3.38	Al ₂ O ₃
K-K'	37	1.060	0.008	0.12	0.21	0.25	K ₂ O
Ca-K	1536	0.949	0.004	4.24	7.73	10.82	CaO
Fe-K	1411	1.399	0.412	4.10	10.47	14.95	Fe ₂ O ₃
Na-K	228	0.549	0.026	0.64	0.67	1.34	Na ₂ O ₃
O			1.764	61.47	44.87		

TN-5500 University of Washington / JEOL SUN 14-NOV-04 12:17

Cursor: 0.000KeV = 0



0.000

VES = 512 10 240

21 041174-14 SP748

SUMTF: QUANTIFY

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	54.5	Si+4	7.6600	7.6600							
Al ₂ O ₃	3.38	Al+3	0.5599	0.3400	0.2199						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	14.95	Fe+3	0.4111			0.4111	0.0000				
MgO	14.73	Mg+2	3.0865			3.0865	0.0000				
MnO	0	Fe+2	1.3002			1.2826	0.0176				
CaO	10.82	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	1.36	Ca+2	1.6292				1.6292	0.0000			
K ₂ O	0.25	Na+	0.3706				0.3532	0.0174	0.0174	0.0000	
		K+	0.0448						0.0448	0.0000	
Total	99.99		Excess	T site	0.2199	C site	0.0176	B site	0.0174033	A site	0

Prefix	none	Total	8	5.0000	1.9824	0.0622	0.0000
Name	actinolite	%Fill	100	100	99.1201		

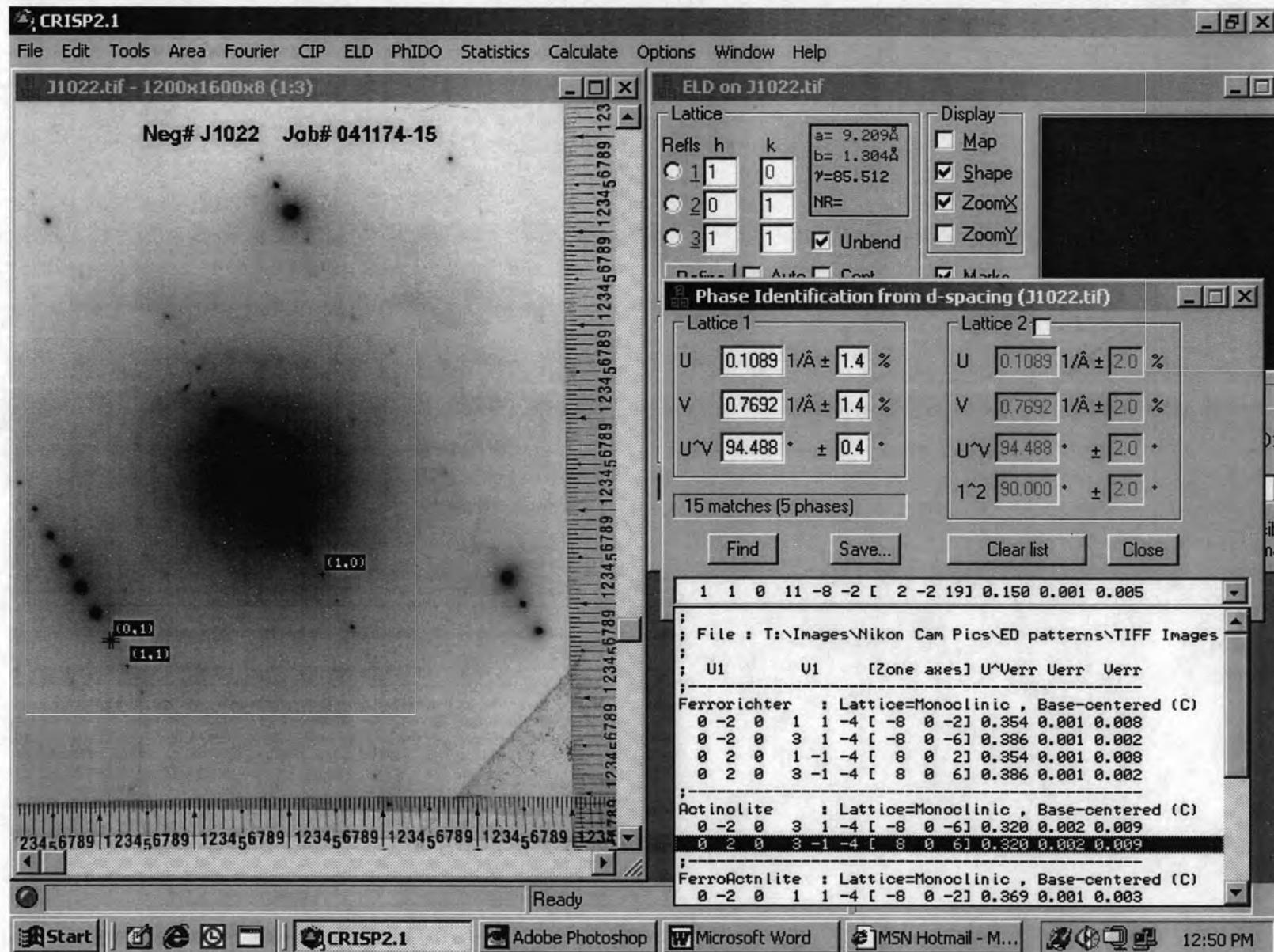
Modifier none
 Group Calcic Amphibole

Sample # 041174-14-748

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.98 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.35 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.63 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.06 Si > 7.5
Mg/(Mg+Fe2)	0.70 (Mg/(Mg+Fe2))< 0.9
Si	7.66

ACTINOLITE

[4 0 3]



IV R.03.1 7870 CO KB

11 8.844

1491 CII KB

SQMTE: QUANTIFY

Standardless Analysis

SQMTE -4B780

Refit _NAK' _NAK"

Refit _MGK' _ALK' _ALK" _K K" _NAK

Chi-sqrd = 3.42

Element	Net Counts	
Si-K	8630	+/- 138
Mg-K	3485	+/- 112
Al-K	492	+/- 62
K-K	128	+/- 30
Ca-K	2485	+/- 106
Fe-K	944	+/- 83
Na-K	0	+/- 0

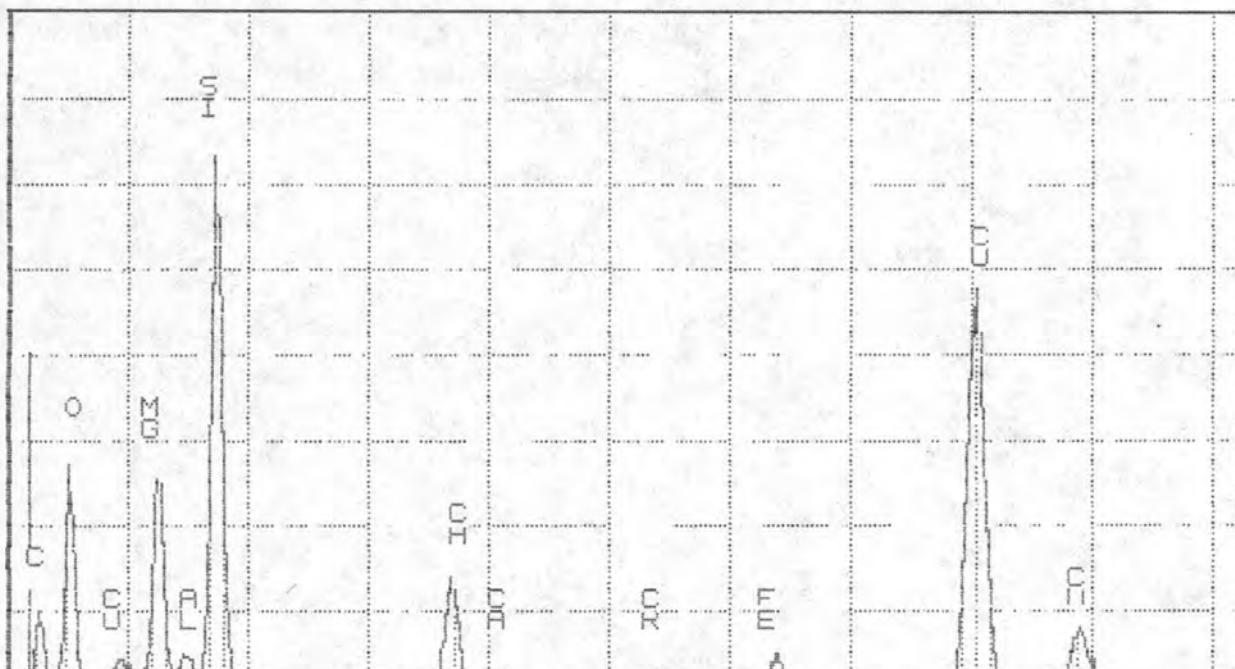
NAREF.S EDS:SiK EDS:MKK EDS:ALK EDS:KK EDS:CAK EDS:FEK EDS:

041174-15 SP750

FL-LINE	PEAK	K-FACTOR	CEL/CREF	ATUM%	EL	WT%	WT%	FORMULA
Si-K	8630	1.000	1.000	21.53	28.43	60.92	ST112	
Mg-K	3485	1.000	0.404	10.14	11.48	19.13	MGO	
Al-K	492	0.750	0.043	0.96	1.22	2.30	AL2O3	
K-K	128	1.060	0.016	0.24	0.45	0.54	K2U	
Ca-K	2485	0.949	0.274	4.12	7.78	10.89	CAO	
Fe-K	944	1.399	0.153	1.65	4.34	6.22	FE2O3	
Na-K	0	0.549	0.000	0.00	0.00	0.00	NA2O3	
O			1.628	61.36	46.29			

TN-5500 University of Washington / JEOL SUN 14-NOV-04 17:36

Cursor: 0.000KeV = 0



0.000 B- 5

VFS = 1024 10.240

41 041174-15 SP/50

1,30

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	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO ₂	60.92	Si+4	8.0000	8.0000							
Al ₂ O ₃	2.3	Al+3	0.3777	0.0000	0.3777						
TiO ₂	0	Ti+4	0.0000	0.0000	0.0000						
Cr ₂ O ₃	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	6.22	Fe+3	0.0910			0.0910	0.0000				
MgO	19.13	Mg+2	3.8543			3.8543	0.0000				
MnO	0	Fe+2	0.6267			0.6267	0.0000				
CaO	10.89	Mn+2	0.0000			0.0000	0.0000				
Na ₂ O	0	Ca+2	1.5884				1.5884	0.0000			
K ₂ O	0.54	Na+	0.0000				0.0000	0.0000	0.0000	0.0000	
		K+	0.1084						0.1084	0.0000	
Total	100		Excess	T site	0.3777	C site	0.0000	B site	0	A site	0

Prefix	none	Total	8	4.9496	1.5884	0.1084	0.0000
Name	actinolite	%Fill	100	98.993	79.4209		
Modifier	none						
Group	Calcic Amphibole						

Sample # 041174-15-750

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.59 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.59 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.11 Si > 7.5
Mg/(Mg+Fe2)	0.86 (Mg/(Mg+Fe2))< 0.9
Si	8.00

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

December 18, 2004

Lisa M. Johnson
Ecology & Environment, Inc.
San Francisco, CA

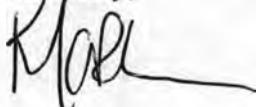
Dear Lisa,

Enclosed is the additional requested QC Data from Lab/Cor, Inc. Below is a checklist of all that is included.

- NVLAP On-Site Assessment Approval
- Our latest NYDOH Proficiency Test Report for Air, Bulk and Water samples
- The latest Interlab results – our raw data for this series of analyses was submitted to Battat Labs for result compilation.
- 1st Packet – Jeol 1200EX QC Data – (October – December)
- 2nd Packet – Philips 410LS QC Data – October
- 3rd Packet – Philips 410LS QC Data – November
- 4th Packet – Philips 410LS QC Data – December

If any further data is necessary, please do not hesitate to call us.

Sincerely,



Kate March
Lab/Cor, Inc.
Seattle WA, 98117

(206)781-0155
kmarch@labcor.net

Johnson, Lisa

From: Johnson, Lisa
Sent: Wednesday, December 15, 2004 4:12 PM
To: 'mail@labcor.net'
Cc: Edwards, Howard
Subject: A few items needed for the El Dorado Hills Data Packages

Hello John,

I am coordinating validation services for Howard Edwards with a third party data service. There are a few more items needed to complete your data packages submitted to E&E on Dec. 7, 2004. Below is the list of items:

- Any TEM equipment maintenance and/or calibration logs, forms or other information for the contract period
- Results and raw data of any recent analysis of in-house standard reference materials or inter-laboratory performance verification
- Most recent copy of your NVLAP and proficiency test results

If you have any questions, please contact me at the number below.

Thank You,

Lisa M. Johnson
START Member
Ecology and Environment, Inc.
(415) 981-2811
(415) 981-0801 fax
ljohnson@ene.com



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899.

May 10, 2004

Mr. John Harris
Lab/Cor, Inc.
7619 Sixth Avenue, NW
Seattle, WA 98117

NVLAP Lab Code: 101920-0

Dear Mr. Harris:

On November 7, 2003, your laboratory was visited by an assessor representing the National Voluntary Laboratory Accreditation Program (NVLAP). The purpose of the visit was to assess your laboratory's compliance with NVLAP criteria for accreditation in the Airborne Asbestos Fiber Analysis (TEM) program.

I am pleased to inform you that the On-Site Assessment Review, which was completed on May 7, 2004, has found that your laboratory meets the on-site assessment requirements. No further action is required on your part, at this time, with regard to the on-site assessment phase of the evaluation of your laboratory.

If you have any questions, please call Thomas R. Davis at (301) 975-6499, or Hazel M. Richmond at (301) 975-3024.

Sincerely,

Warren R. Merkel, NVLAP Chief
Laboratory Accreditation Program

WADSWORTH CENTER
NEW YORK STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL LABORATORY APPROVAL PROGRAM

Page 1 of 1

Proficiency Test Report

Lab Id: 11747	LABCOR INC 7619 SIXTH AVENUE NW SEATTLE, WA-98117-4037 (206) 781-0155 Director: MR. JOHN HARRIS	Shipment Date : 07-Sep-2004
EPA Lab Code: Not on File		Closing Date : 22-Oct-2004
		Score Date : 09-Nov-2004

This report may contain data that are not covered by the NVLAP accreditation.

** Indicates NVLAP accredited analyte evaluated using the USEPA's National Standards for Water Proficiency Testing Studies Criteria Document.
NVLAP Lab Code 200387-0. ELAP is an A2LA accredited Proficiency Testing Provider. Certificate Number 1785.01

Shipment: 276 Asbestos in Air, Water, and NonFriable Samples by Electron Microscopy

Analyte Name	Units	Sample ID	Method	Result	Mean/ Target *	Warning Limits	Acceptance Limits	Score
Sample: Air and Emissions Asbestos in Air by TEM								
Asbestos in Air by TEM EPA Code: N/A	Struct/	1728	40 CFR APX A No. III	41.4	88.4		D.L. - 196 <i>28 passed out of 29 reported results.</i>	Satisfactory
Dominant Asbestos Type EPA Code: N/A		1728	40 CFR APX A No. III	Act	Act			Satisfactory <i>16 passed out of 29 reported results.</i>
Dominant Asbestos Type EPA Code: N/A		1987	40 CFR APX A No. III	Amosite	Amosite			Satisfactory <i>27 passed out of 29 reported results.</i>
Asbestos in Air by TEM EPA Code: N/A	Struct/	1987	40 CFR APX A No. III	10741	8040		660 - 15400 <i>29 passed out of 29 reported results.</i>	Satisfactory

Sample: Solid and Hazardous Waste Asbestos in Non-Friable Material

Percent Asbestos in Residue EPA Code: N/A	%	1785	ITEM 198.4 OF MANUAL	60	47.7	D.L. - 98.7 <i>29 passed out of 29 reported results.</i>	Satisfactory
Percent Residue EPA Code: N/A	%	1785	ITEM 198.4 OF MANUAL	54.51	63.3	28.8 - 97.8 <i>28 passed out of 29 reported results.</i>	Satisfactory
Percent Residue EPA Code: N/A	%	5706	ITEM 198.4 OF MANUAL	17.71	18.0	13.2 - 22.8 <i>28 passed out of 29 reported results.</i>	Satisfactory
Percent Asbestos in Residue EPA Code: N/A	%	5706	ITEM 198.4 OF MANUAL	55	38.7	D.L. - 93.9 <i>29 passed out of 29 reported results.</i>	Satisfactory

Sample: Potable Water Asbestos in Water by TEM

Asbestos in Water by TEM ** EPA Code: 0253	MF/L	4233	EPA 100.2	8.179	3.00 *	D.L. - 19.8 <i>22 passed out of 23 reported results.</i>	Satisfactory
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NISTIR 5351 - Analyst Summary

Verifying Analyst rgs *	Analyst #1 bl	Analyst #2 drw	Analyst #3 mq	Analyst #4 km	Analyst #5 mp **	Analyst #5 yz **
Cumulative TP/TNS (should be >0.85)	0.980	0.980	1.000	0.980	0.918	0.926
Cumulative FP/TNS (should be <0.05)	0.020	0.000	0.041	0.000	0.000	0.000
Cumulative FN/TNS (should be <0.10)	0.020	0.020	0.000	0.020	0.082	0.074

* Since RGS was verifying analyst, values will not be calculated.

** MP and YZ each analyzed only 2 of the four grid openings.

Summary of Grid Openings Analyzed

Grid Opening H-2: Seven structures were verified. This opening yielded good duplication. There were no FN recorded. Only two occurrences (causing FP) were in question. Nearly one-third of the way through the opening, a matrix with a fibril of Chrysotile attached was found. The fibril protruding from the matrix was <5:1 aspect and was about 4 μm in length. One analyst (MQ) counted it as a matrix structure. The second occurrence was similar to the first. A matrix having a Chrysotile "fibril" protruding was found halfway through the opening. In this case, the fibril was protruding less than 3 μm from the matrix. The aspect ratio of the protrusion was less than 3:1. One analyst (MQ) counted this as a matrix structure.

Grid Opening E-2: Fifteen structures were verified. This opening also yielded good duplication. No FP were recorded. Only one occurrence (causing FN) was in question. Near the start of the opening, a bundle (avg L: 3.5 μm , W: 1.2 μm) consisting of Chrysotile fibers was found. At the onset of the round, I (RGS) had originally listed the occurrence as a non-structure, feeling that the overall aspect of approximately 3:1 would disqualify it. Upon closer examination, I agree that the fibers within the matrix are discernable and the aspect ratios of the individual fibers within the bundle qualify it as a bundle structure. Only one other analyst (MP) did not list the occurrence as a structure. Although I listed it as a FNA (feeling that MP saw the structure as I first did), it is uncertain whether his omission should be listed as a FNA or FNB. MP also did not list TPM9, and was listed as FNB.

Grid Opening D-9: Twenty-one structures were verified. This opening also yielded good duplication. A few structures were in question, yielding FN. Near the start of the opening, along the left grid bar, a Chrysotile fiber (approximately 1.5 μm long, 0.1 μm wide) was found. Only one analyst (BL) did not list the occurrence as a structure. Structure TPM9 is a bundle of Chrysotile (approximately 4.5 μm long and 0.6 μm wide). This occurrence was listed as ambiguous by DRW and was not listed by KM. Structures TPM12 and TPM20 were not listed by YZ. Both of these occurrences are thin, single fibrils (about 1.0 μm long and 0.07 μm wide) of Chrysotile and it is assumed that the analyst simply missed the fiber.

Grid Opening E-20: Six structures were verified. This opening also yielded perfect duplication. All analysts listed six Chrysotile structures on their countsheet.

Overall Notes

As can be seen above, all analysts participating had "TP/FN/FP values" within the acceptable limits listed by NVLAP and in the NISTIR-5351. In addition to these values, I statistically tracked the reproducibility of fiber-sizing. I also wanted to track the accurate classification of structures (fiber, bundle, cluster and matrix) but not all analysts indicated structure class on the countsheets.

Problems noted during the verification process: Lack of fiber classification (see note above), fiber sizing not consistently precise (significant figures), lack of sketch detail causing the verification process to be more time-consuming. It helps to include any objects close in proximity to the structure and to include the grid bar in the sketch when it is nearby. The most significant problem noted was the counter-clockwise deviation of two grid openings by two analysts. Please be sure to follow grid orientation instructions to help cut-down the time taken in the verification process. It was also noted that two of the participating analysts only analyzed two grid openings apiece. To offer the best statistical value to the round, please have all TEM analysts read all the grid openings submitted for that round. Thanks to everyone for their timely submission of results. If anyone has any questions regarding these results, please feel free to contact me by phone or e-mail.

BATTA

Sample Type: 01-1-3
 Sample Archive Location: E-5
 Grid Opening ID: H-2

Verified Asbestos Analysis

Analytical Values	Verifying Analyst**	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12	Analysis 13	Analysis 14	Analysis 15	Analysis 16	Analysis 17	Analysis 18	Analysis 19	Analysis 20
Date of Analysis	07/28/04	07/28/04	08/19/04	08/20/04	08/25/04	09/20/04															
TEM Operator	rgs	bl	drw	mq	km	mp															
Structures Reported (SR)	7	7	7	9	7	7															
True Positives (TP)	7	7	7	7	7	7															
TPM	7	7	7	7	7	7															
TPU	0	0	0	0	0	0															
*TPV (TP found by verifying analyst, but NOT found by any analyst)																					0
*Total Number of Structures (TNS) (all analysts)																					7
*Total Number of Structures (TNS) (one analyst)	7	7	7	7	7	7															
False Positives (FP)						2															
False Negatives (FN)		0	0	0	0	0															
FNA																					
FNB																					
Not Located (NL)																					
Ambiguous (AMB)																					
TP/TNS	1.000	1.000	1.000	1.000	1.000																
FP/TNS	0.000	0.000	0.286	0.000	0.000																
FN/TNS	0.000	0.000	0.000	0.000	0.000																
[(TP/TNS) + (FN/TNS)] (must equal 1.00)	1.000	1.000	1.000	1.000	1.000	1.000															

*Value for these items will be the same for all analysts.

**Verifying analyst should not be one of the TEM Operators.

Refer to NISTIR 5351 for guidance.

BATTA

Statistical Review of Structure Assignment From Verified Asbestos Analysis

Only structures verified as "TPM" are recorded.

BATTA

Sample Type: 01-1-3
 Sample Archive Location: E-5
 Grid Opening ID: E-2

Verified Asbestos Analysis

Analytical Values	Verifying Analyst**	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12	Analysis 13	Analysis 14	Analysis 15	Analysis 16	Analysis 17	Analysis 18	Analysis 19	Analysis 20
Date of Analysis	07/28/04	07/28/04	08/19/04	08/26/04	08/25/04	09/20/04															
TEM Operator	rgs	bl	drw	mq	km	mp															
Structures Reported (SR)	15	15	15	15	15	15															
True Positives (TP)	15	15	15	15	15	15															
*TPV	15	15	15	15	15	13															
TPU	0	0	0	0	0	2															
*TPV (TP found by verifying analyst, but NOT found by any analyst)																					0
*Total Number of Structures (TNS) (all analysts)																					15
*Total Number of Structures (TNS) (one analyst)	15	15	15	15	15	15															
False Positives (FP)																					
False Negatives (FN)		0	0	0	0	2															
FNA							1														
FNB							1														
Not Located (NL)																					
Ambiguous (AMB)																					
TP/TNS	1.000	1.000	1.000	1.000	0.867																
FP/TNS	0.000	0.000	0.000	0.000	0.000																
FN/TNS	0.000	0.000	0.000	0.000	0.133																
[(TP/TNS) + (FN/TNS)] (must equal 1.00)	1.000	1.000	1.000	1.000	1.000																

*Value for these items will be the same for all analysts.

**Verifying analyst should not be one of the TEM Operators.

Refer to NISTIR 5351 for guidance.

BATTA

Statistical Review of Structure Assignment From Verified Asbestos Analysis

Only structures verified as "TPM" are recorded.

BATTA

Sample Type: 01-1-3
 Sample Archive Location: N-5
 Grid Opening ID: D-9

Verified Asbestos Analysis

Analytical Values	Verifying Analyst**	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12	Analysis 13	Analysis 14	Analysis 15	Analysis 16	Analysis 17	Analysis 18	Analysis 19	Analysis 20
Date of Analysis	07/28/04	07/28/04	08/25/04	08/30/04	08/11/04	09/20/04															
TEM Operator	rgs	bl	drw	mq	km	yz															
Structures Reported (SR)	21	22	21	21	21	21															
True Positives (TP)	21	21	21	21	21	21															
*TPM	21	20	20	21	20	19															
TPU	0	1	1	0	1	2															
*TPV (TP found by verifying analyst, but NOT found by any analyst)											0										
*Total Number of Structures (TNS) (all analysts)											21										
*Total Number of Structures (TNS) (one analyst)	21	21	21	21	21	21															
False Positives (FP)		1																			
False Negatives (FN)		1	1	0	1	2															
FNA			1																		
FNB		1			1	2															
Not Located (NL)																					
Ambiguous (AMB)																					
TP/TNS	0.952	0.952	1.000	0.952	0.905																
FP/TNS	0.048	0.000	0.000	0.000	0.000																
FN/TNS	0.048	0.048	0.000	0.048	0.095																
[(TP/TNS) + (FN/TNS)] (must equal 1.00)	1.000	1.000	1.000	1.000	1.000																

*Value for these items will be the same for all analysts.

**Verifying analyst should not be one of the TEM Operators.

Refer to NISTIR 5351 for guidance.

BATTA

Statistical Review of Structure Assignment From Verified Asbestos Analysis

Only structures verified as "TPM" are recorded.

BATTA

Sample Type: 01-1-3
 Sample Archive Location: N-5
 Grid Opening ID: E-20

Verified Asbestos Analysis

Analytical Values	Verifying Analyst**	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12	Analysis 13	Analysis 14	Analysis 15	Analysis 16	Analysis 17	Analysis 18	Analysis 19	Analysis 20
Date of Analysis	07/28/04	07/28/04	08/25/04	08/30/04	08/11/04	09/20/04															
TEM Operator	rgs	bl	drw	mq	km	yz															
Structures Reported (SR)	6	6	6	6	6	6															
True Positives (TP)	6	6	6	6	6	6															
*TPM	6	6	6	6	6	6															
TPU	0	0	0	0	0	0															
*TPV (TP found by verifying analyst, but NOT found by any analyst)											0										
*Total Number of Structures (TNS) (all analysts)										6											
*Total Number of Structures (TNS) (one analyst)	6	6	6	6	6	6															
False Positives (FP)																					
False Negatives (FN)		0	0	0	0	0															
FNA																					
FNB																					
Not Located (NL)																					
Ambiguous (AMB)																					
TP/TNS	1.000	1.000	1.000	1.000	1.000																
FP/TNS	0.000	0.000	0.000	0.000	0.000																
FN/TNS	0.000	0.000	0.000	0.000	0.000																
$(TP/TNS) + (FN/TNS)$ (must equal 1.00)	1.000	1.000	1.000	1.000	1.000																

*Value for these items will be the same for all analysts.

**Verifying analyst should not be one of the TEM Operators.

Refer to NISTIR 5351 for guidance.

BATTA

Statistical Review of Structure Assignment From Verified Asbestos Analysis

Only structures verified as "TPM" are recorded.

Screen and Camera Magnification Calibration

Date of Measurement: 11/1/2004

Analyst: JH

Setting: 20,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/1/2004	973					
Screen		SM1 22.3	SM2 22.2	SM3 22.3	SM4 22.3	SM5 22.1
Date	# Spaces	Magnification				
11/1/2004	22.24	15540				

Screen/Camera Ratio
#VALUE!

Setting: 15,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/1/2004	ND *					
Screen		SM2 29.2	SM3 29.2	SM4 29.1	SM5 29.3	29.1
Date	# Spaces	Magnification				
11/1/2004	29.18	11844				

Screen/Camera Ratio
#VALUE!

Setting: 10,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/1/2004	974					
Screen		SM1 43.7	SM2 43.7	SM3 43.7	SM4 43.6	SM5 43.8
Date	# Spaces	Magnification				
11/1/2004	43.7	7908				

Screen/Camera Ratio
#VALUE!

Setting: 5,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/1/2004	975					

Setting: 1,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/1/2004	ND					

D₁ = The smaller measurement of the Supper Device in mm.

D₂ = The larger measurement of the Supper Device in mm.

D = D₂ - D₁

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Camera Magnification = (D/# spaces) * 2160

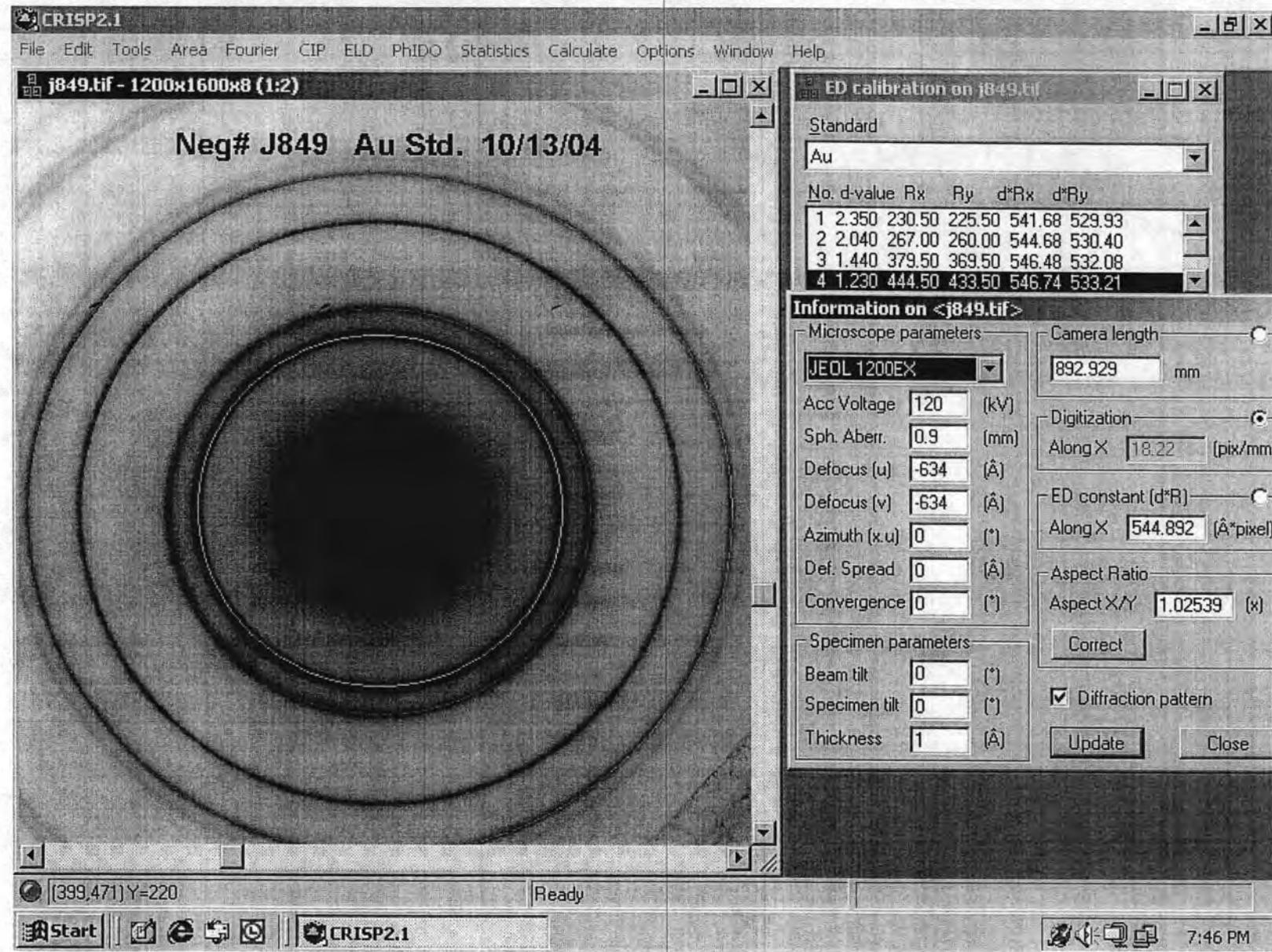
Screen Magnification = (155/# spaces) * 2160

* ND - Not Done

Au Std.

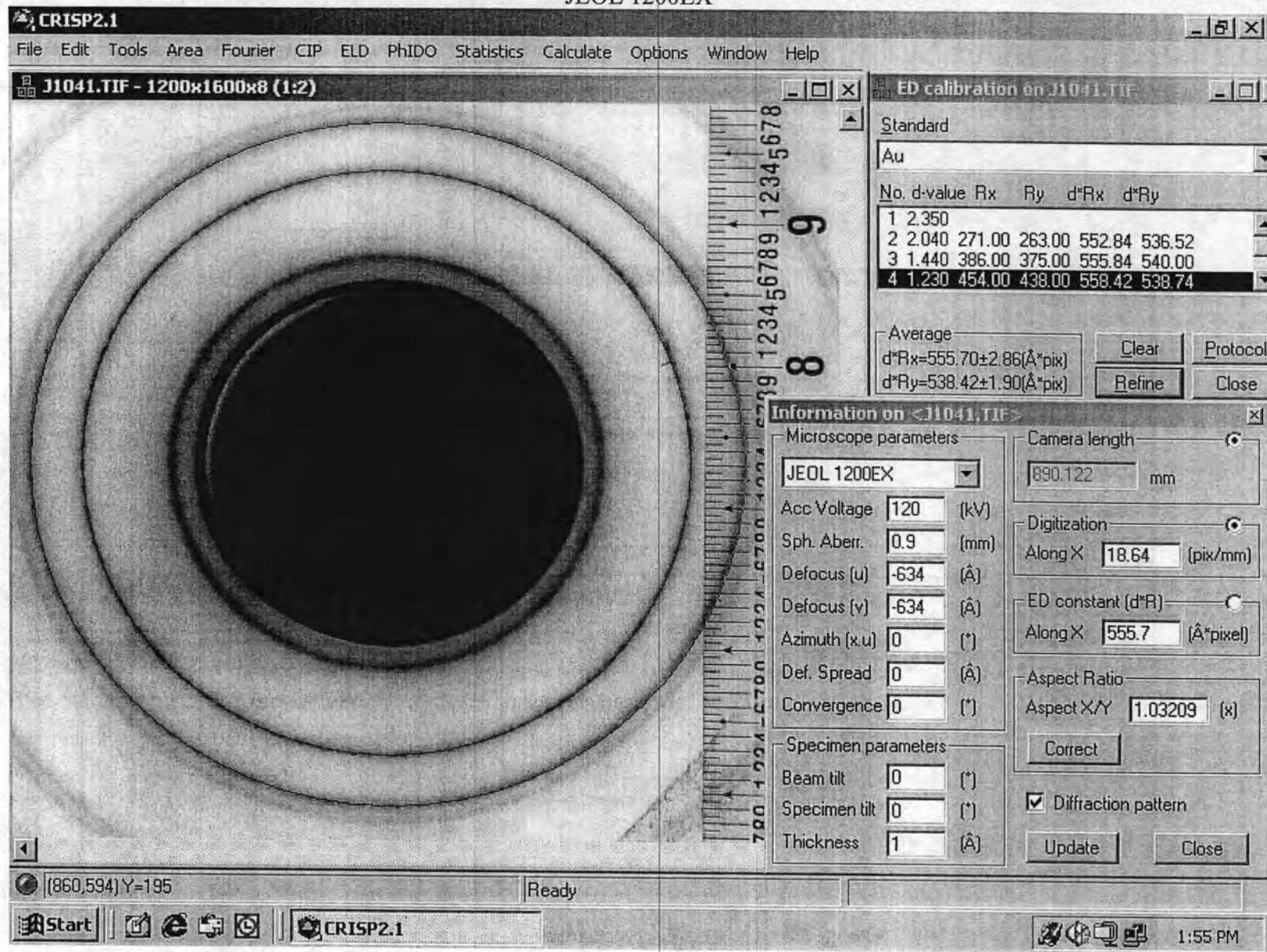
Jeol

10/13/04



Au Std. 11/18/04

JEOL 1200EX



Screen and Camera Magnification Calibration

Date of Measurement: 12/16/2004

Analyst: JH

Setting: 20,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
12/16/2004	1178					
Screen		SM1 22.2	SM2 22.1	SM3 22.3	SM4 22.3	SM5 22.1
Date	# Spaces	Magnification				
12/16/2004	22.2	15568				

Screen/Camera Ratio
#VALUE!

Setting: 10,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
12/16/2004	1179					
Screen		SM1 43.6	SM2 43.9	SM3 43.6	SM4 43.8	SM5 43.7
Date	# Spaces	Magnification				
12/16/2004	43.72	7905				

Screen/Camera Ratio
#VALUE!

Setting: 5,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
12/16/2004	1180					

D₁ = The smaller measurement of the Supper Device in mm.

D₂ = The larger measurement of the Supper Device in mm.

D = D₂ - D₁

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Camera Magnification = (D/# spaces) * 2160

Screen Magnification = (155/# spaces) * 2160

* ND - Not Done

k-factor Calibration				
KFACTOR SUMMARY				
Date:	12/16/2004			
Analyst:	JH			
Microscope:	JEOL 1200EX			
Spectra Number	Mg	Si	Ca	Fe
1	1.08	1.00	1.35	2.02
2	1.07	1.00	1.32	2.01
3	1.08	1.00	1.32	1.82
4	1.08	1.00	1.36	2.04
5	1.08	1.00	1.37	2.01
Average	1.08	1.00	1.34	1.98
Standard Deviation	0.00	0.00	0.02	0.09
2s	0.01	0.00	0.04	0.18
STDEV Pass/Fail	Pass	Pass	Pass	Pass
Sensitivity (Mg:Fe)	0.54			
Pass/Fail	PASS			
Sensitivity (Mg:Fe) values greater than 1.5 are failed. Instrument must be taken out of operation, serviced and k-factor calibrations redone before instrument may be place back into service.				
Relative kfactor values	Rounded value	Limits	Pass/Fail	
Na				
Mg				
Al				
Ca				
Fe				

SRM 2063a Raw data

Spectra Number		Mg	Si	Ca	Fe
1	Background	0	0	0	0
	Net Area Counts	24742	84619	29201	18246
	Counts - Background	24742	84619	29201	18246
	Isi/Ia	3.42005497	1	2.897811719	4.63767401
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.08	1.00	1.35	2.02
2	Background	0	0	0	0
	Net Area Counts	24546	83655	29487	18124
	Counts - Background	24546	83655	29487	18124
	Isi/Ia	3.40809093	1	2.837012921	4.61570294
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.07	1.00	1.32	2.01
3	Background	0	0	0	0
	Net Area Counts	29488	101272	35702	24262
	Counts - Background	29488	101272	35702	24262
	Isi/Ia	3.43434617	1	2.836591788	4.17409941
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.08	1.00	1.32	1.82
4	Background	0	0	0	0
	Net Area Counts	25022	85746	29481	18338
	Counts - Background	25022	85746	29481	18338
	Isi/Ia	3.42682439	1	2.90851735	4.67586433
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.08	1.00	1.36	2.04
5	Background	0	0	0	0
	Net Area Counts	24843	85039	29000	18461
	Counts - Background	24843	85039	29000	18461
	Isi/Ia	3.4230568	1	2.93237931	4.60641352
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.08	1.00	1.37	2.01

Albite Standard Calibration

SRM 99a (Version#1)

Date: 12-16-04
Analyst: JH

SRM 99a Raw Data

SRM 99a Raw Data

Spectra Number		Na	Al	Si
1	Background	0	0	0
	Gross Area	858	4609	28138
	Net Area Counts	858	4609	28138
	Cx/Csi	0.11838624	0.4457672	1
	Isi/Ix	32.7948718	6.10501193	1
	k-factor	3.88	2.72	1.00
2	Background	0	0	0
	Gross Counts	192	1460	1737
	Net Counts	192	1460	1737
	Cx/Csi	0.11838624	0.4457672	1
	Isi/Ix	9.046875	1.18972603	1
	k-factor	1.07	0.53	1.00

Albite Standard Calibration
SRM 99a

Date: 12/16/2004
Analyst: jh

Spectra Number	Na	Al	Si
1	0.90	1.43	1.00
2	1.91	1.76	1.00
3	1.41	1.62	1.00
4	0.94	1.82	1.00
5	0.89	1.33	1.00
Average	1.21	1.59	1.00
Standard Deviation	0.45	0.21	0.00
2s	0.90	0.42	0.00
Na Limits	1.21	PASS	
Al Limits	1.59	PASS	

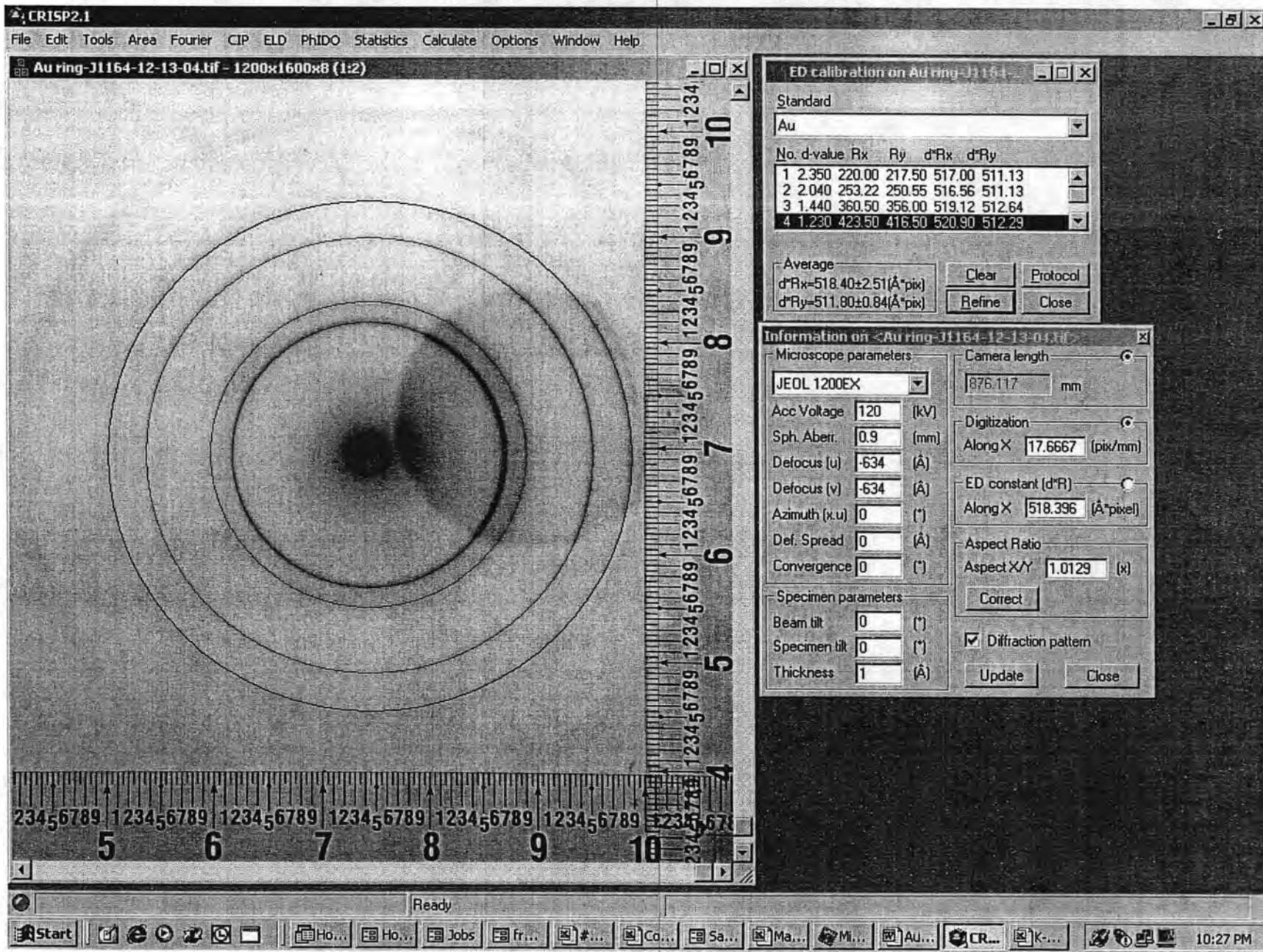
SRM 99a Raw Data

Spectra Number		Na	Al	Si
1	Background			
	Area Counts	9419	22320	71365
	Net Counts	9419	22320	71365
	Cx/Csi	0.118386243	0.4457672	1
	Isi/Ix	7.576706657	3.1973566	1
	k-factor	0.90	1.43	1.00
2	Background			
	Area Counts	3370	13800	54377
	Net Counts	3370	13800	54377
	Cx/Csi	0.118386243	0.4457672	1
	Isi/Ix	16.13560831	3.9403623	1
	k-factor	1.91	1.76	1.00

3	Background			
	Area Counts	4692	15360	55914
	Net Counts	4692	15360	55914
	Cx/Csi	0.118386243	0.4457672	1
	Isi/Ix	11.9168798	3.6402344	1
	k-factor	1.41	1.62	1.00
4	Background			
	Area Counts	8496	16427	67125
	Net Counts	8496	16427	67125
	Cx/Csi	0.118386243	0.4457672	1
	Isi/Ix	7.900776836	4.0862604	1
	k-factor	0.94	1.82	1.00
5	Background			
	Area Counts	8414	21097	63127
	Net Counts	8414	21097	63127
	Cx/Csi	0.118386243	0.4457672	1
	Isi/Ix	7.50261469	2.9922264	1
	k-factor	0.89	1.33	1.00

BEAM DOSE CALIBRATION						
(Version#1)						
Date:	12/16/2004					
Analyst:	JH					
Microscope:	JEOL 1200EX					
Fiber Length used in analysis (um):						
Time (sec)	Visual	Neg #	Recordable Diffraction	EDS	Photo	
0	Y		ND*			
30	Y		ND*			
60	Y	1181	Y			
90	Y	1182	Y			
120	Y	1183	Y			
150	Y	1184	Y	865	1185	
PASS/FAIL	PASS		PASS			
*ND - Not Done						
Visual - Mark "Y" if diffraction pattern is seen on screen, mark "N" if pattern is not seen on screen						
Recordable Diffraction - Mark "Y" if diffraction pattern is seen on negative, mark "N" if pattern is not seen on negative						
Chrysotile Fiber Specs.: Single fibril, >= 1.0 micron in length						

Au Std. 12/13/04
JEOL 1200EX
Neg J1164



ED calibration on Au ring-J1164

Standard

Au

No.	d-value	R _x	R _y	d [*] R _x	d [*] R _y
1	2.350	220.00	217.50	517.00	511.13
2	2.040	253.22	250.55	516.56	511.13
3	1.440	360.50	356.00	519.12	512.64
4	1.230	423.50	416.50	520.90	512.29

Average

d^{*}R_x=518.40±2.51(Å*pix)

d^{*}R_y=511.80±0.84(Å*pix)

Information on <Au ring-J1164-12-13-04.tif>

Microscope parameters

JEOL 1200EX

Acc Voltage 120 (kV)

Sph. Aberr. 0.9 (mm)

Defocus (u) 634 (Å)

Defocus (v) 634 (Å)

Azimuth (x.u) 0 (°)

Def. Spread 0 (Å)

Convergence 0 (°)

Camera length

876.117 mm

Digitization

Along X 17.6667 (pix/mm)

ED constant (d^{*}R)

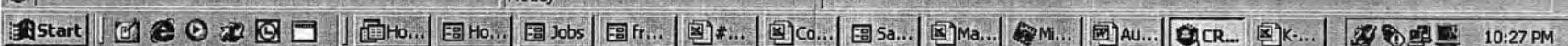
Along X 518.396 (Å*pixel)

Aspect Ratio

Aspect X/Y 1.0129 [x]

Diffraction pattern

Ready



1,30

*

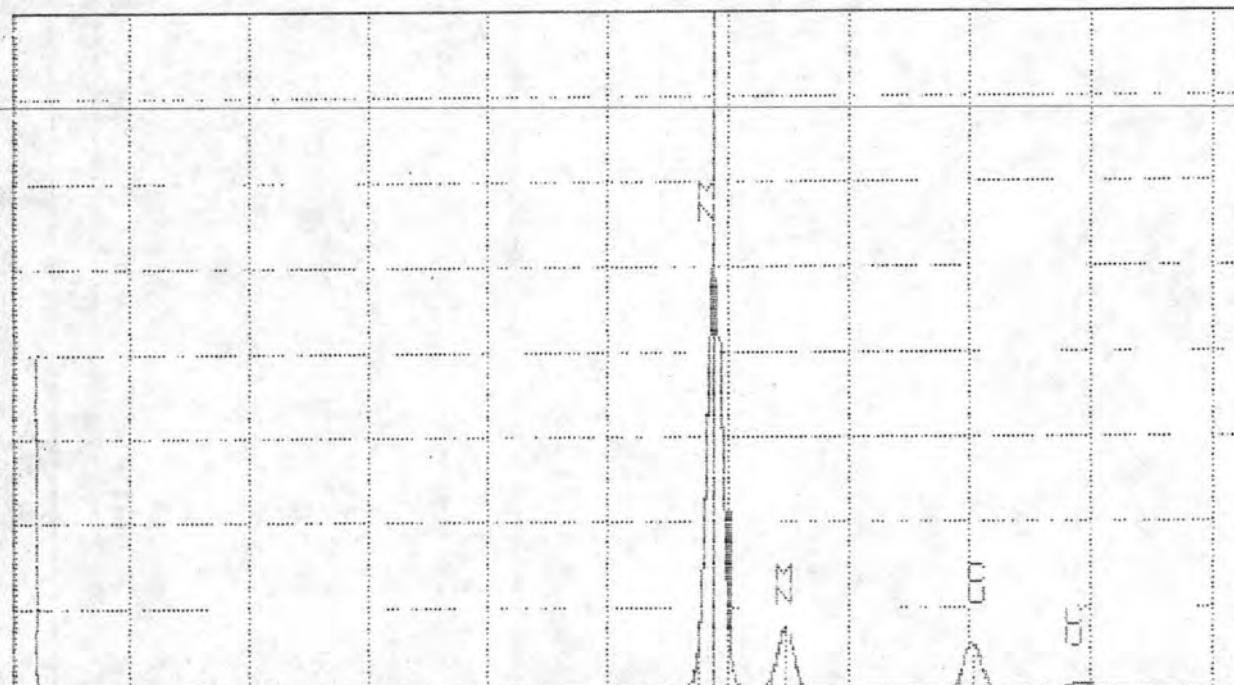
MN RESOL 12-1A-04 SP 1689ECH

CENTR. AREA FWHM

	AREA	FWHM
2H5	216	25 N
601	348	151
929	649	117
4142	671	135
5406	918	120
5888	168451	141
6742	241321	150
8028	14145	159
H840	2924	179

RESOLUTION = 141

TN-SHIN University of Washington / JEOL HRD 17-DEU-04 04:01
Current: 5.890KeV = 10/25



0.000

B- 5

VFS = 16344 1n x40

166

MN RESOL 12-1A-04 SP864

*

*QM1F: QUANTIFY

*Standardless Analysis

*X 'SQM1F'

Chi-sqrd = 8.95

Element	Net Counts	
Si-K	23333	+/- 284
Mg-K	2640	+/- 256
Al-K	1775	+/- 308
Ca-K	179	+/- 106
Fe-K	16594	+/- 241
Na-K	4302	+/- 188
K-K	270	+/- 101

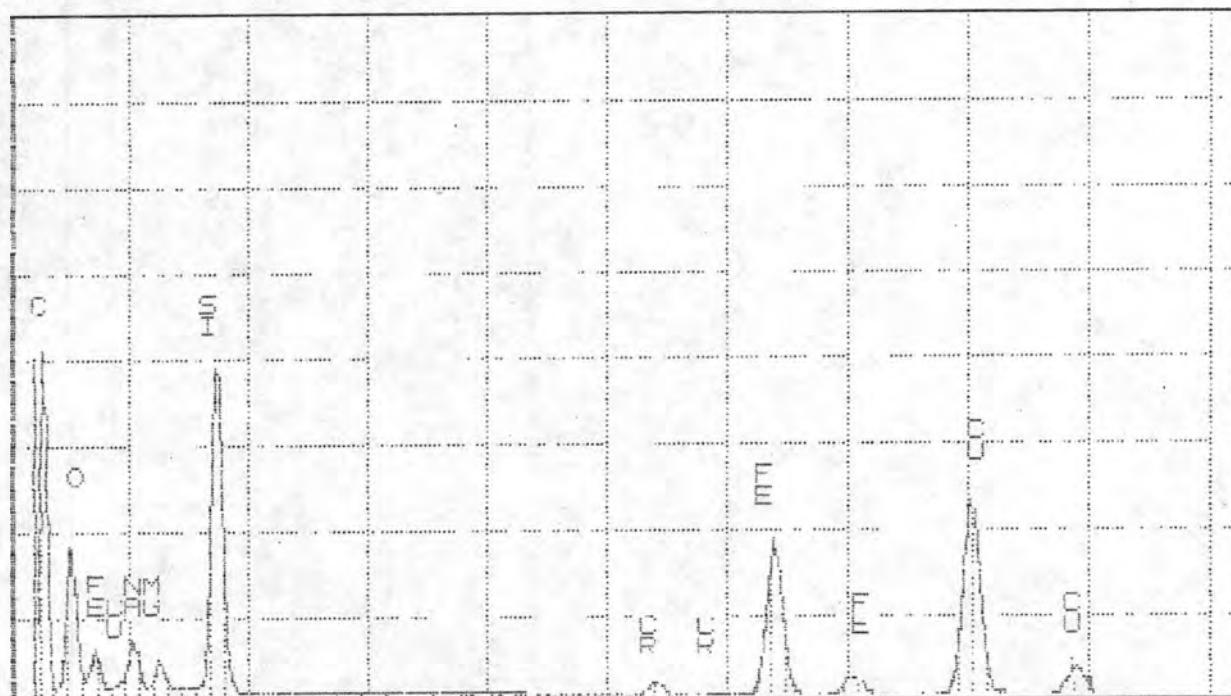
REFRS: EDS:SiK EDS:MGK EDS:ALK EDS:CAK EDS:FEK EDS:NAK EDS:K

CRUC STD 12-16-04 SP863

EL-I TNE	PEAK	K-FACTOR	CEL/CREF	ATOM%	EL WT%	WT%	FORMULA
Si-K	23333	1.0000	1.0000	20.22	24.61	52.74	SiO2
Mg-K	2640	1.0000	0.1111	2.44	2.77	4.62	MgO
Al-K	1775	0.7500	0.0411	0.86	1.01	1.91	Al2O3
Ca-K	179	0.944	0.0077	0.10	0.18	0.25	CaO
Fe-K	16594	1.349	0.944	10.07	14.51	35.01	Fe2O3
Na-K	4302	0.549	0.101	2.50	2.50	5.10	Na2O3
K-K	270	1.059	0.012	0.18	0.10	0.34	K2O
□			1.792	63.42	44.12		

TN-SHIN University of Washington / JEOL THU 16-OCT-04 23:31

Current: 0 000KeV = 0



0.000 R- 5

VFS = 4046 10.240

162 CRUC STD 12-16-04 SP863

- b. for spot size measurement, see:
- D. B. Williams, *Practical Analytical Electron Microscopy in Materials Science*, Philips Electronics Instruments, Inc., Mahwah, New Jersey, 1984, pp. 34-35 (for TEM or STEM mode);
- D. B. Williams, *Standardized Definitions of X-ray Analysis Performance Criteria in the AEM*, in A. D. Romig Jr. and W. F. Chambers, (ed.), *Microbeam Analysis 1986*, San Francisco Press, San Francisco, 1986, pp. 443-448 (for TEM mode); and
- J. I. Goldstein, et al., *Scanning Electron Microscopy and X-ray Microanalysis*, Plenum Press, New York, 1981, p. 48 (for STEM mode);
- c. for k-factor measurement, see:
- D. C. Joy, A. D. Romig, J. I. Goldstein, *Introduction to Analytical Electron Microscopy*, Plenum Press, New York, 1986; or
- D. B. Williams, *Practical Analytical Electron Microscopy in Materials Science*, Philips Electronics Instruments, Inc., Mahwah, New Jersey, 1984;
- d. for quality assurance, see J. K. Taylor, *Quality Assurance of Chemical Measurements*, Lewis Publishers, Chelsea, Michigan, 1987;
- e. for statistical analysis, see M. G. Natrella, *Experimental Statistics*, John Wiley & Sons, New York, 1966;
- f. for control charts, see *Manual on Presentation of Data and Control Chart Analysis*, ASTM, Philadelphia, 1991; and
- g. reference data on the crystallography and chemical composition of minerals that analytically interfere with the regulated asbestos minerals.

3 Personnel

- 3.1 Staff members are aware of both the extent and limitation of their area of responsibility.
- 3.2 The laboratory has a written description of its training program which includes training with standards and blind testing to determine competency and criteria for successful completion.
- 3.3 Analysts and technical supervisors participate in an appropriate form of continuing education, such as formal coursework, in-house education, and scientific or technical meetings, and have access to journals that describe advances in the field of electron microscopy and/or asbestos analysis.
- 3.4 The technical supervisor(s) shall be qualified to conduct AEM studies, apply AEM to crystalline materials and is knowledgeable in the field of asbestos analysis including procedures for sample handling, preparation, analysis, storage, disposal, and contamination monitoring.
- 3.5 AEM analysts are trained and are proficient in:
 a. AEM use, calibration, alignment, electron micrography (or functional equivalent);

should be from the low end (0.7 keV to 2 keV) and the other peak from the high end (7 keV to 10 keV) of this range. The calibration of the x-ray energy is checked prior to each analysis of samples and recalibrated if out of the specified range.

6.11 The relative sensitivity (k-factors) factors relative to Si for elements found in asbestos (Na, Mg, Al, Si, Ca, Fe) are determined so that:

- a. the k-factors are determined to a precision (2 s) within 10% relative to the mean value obtained for Mg, Al, Si, Fe, and within 20% relative to the mean value obtained for Na;
- b. the k-factor relative to Si for Na is between 1.0 and 4.0, for Mg and Fe is between 1.0 and 2.0, and for Al and Ca is between 1.0 and 1.75; and
- c. the k-factor for Mg relative to Fe on SRM 2063(a) or other standard traceable to NIST is 1.5 or less.

NOTE: SRM 2063 or SRM 2063a can be used for the determination of k-factors for Mg, Si, Ca and Fe. The laboratory must obtain its own chemically characterized materials for determining the Na and Al k-factors. Examples include albite for Na k-factor determination and biotite or albite for Al k-factor determination. Na k-factors are sensitive to electron beam dose (current and time). It is suggested that small particles ($\leq 0.1 \mu\text{m}$ in size) be used for Na k-factor determination to minimize the effect of Na migration.

6.12 The portions of a grid in a specimen holder for which abnormal x-ray spectra are generated under routine asbestos analysis conditions are determined and these areas are avoided in asbestos analysis.

NOTE: X-rays can be absorbed due to the relative position of the area of interest, the grid bars, specimen holder and x-ray detector and give an abnormal spectra (for an example of an abnormal spectra see S. Turner, E. B. Steel, S. S. Doorn, and S. B. Burris, "Proficiency Tests for the NIST Airborne Asbestos Program - 1991," NISTIR 5432). The laboratory should use a standard material (SRM 2063 is recommended) to map out the spectra obtained over the grid area and to thereby determine the regions that should be avoided in routine analysis.

6.13 The low temperature ashing is calibrated by determining a calibration curve for the weight vs. ashing time of collapsed mixed-cellulose-ester (mce) filters.

NOTE: The AHERA method specifies that a mixed-cellulose-ester filter is to be ashed by 10%. However, if ashing by this amount generates a texture in the replica that affects structure counting, it is permissible to etch by less than this amount.

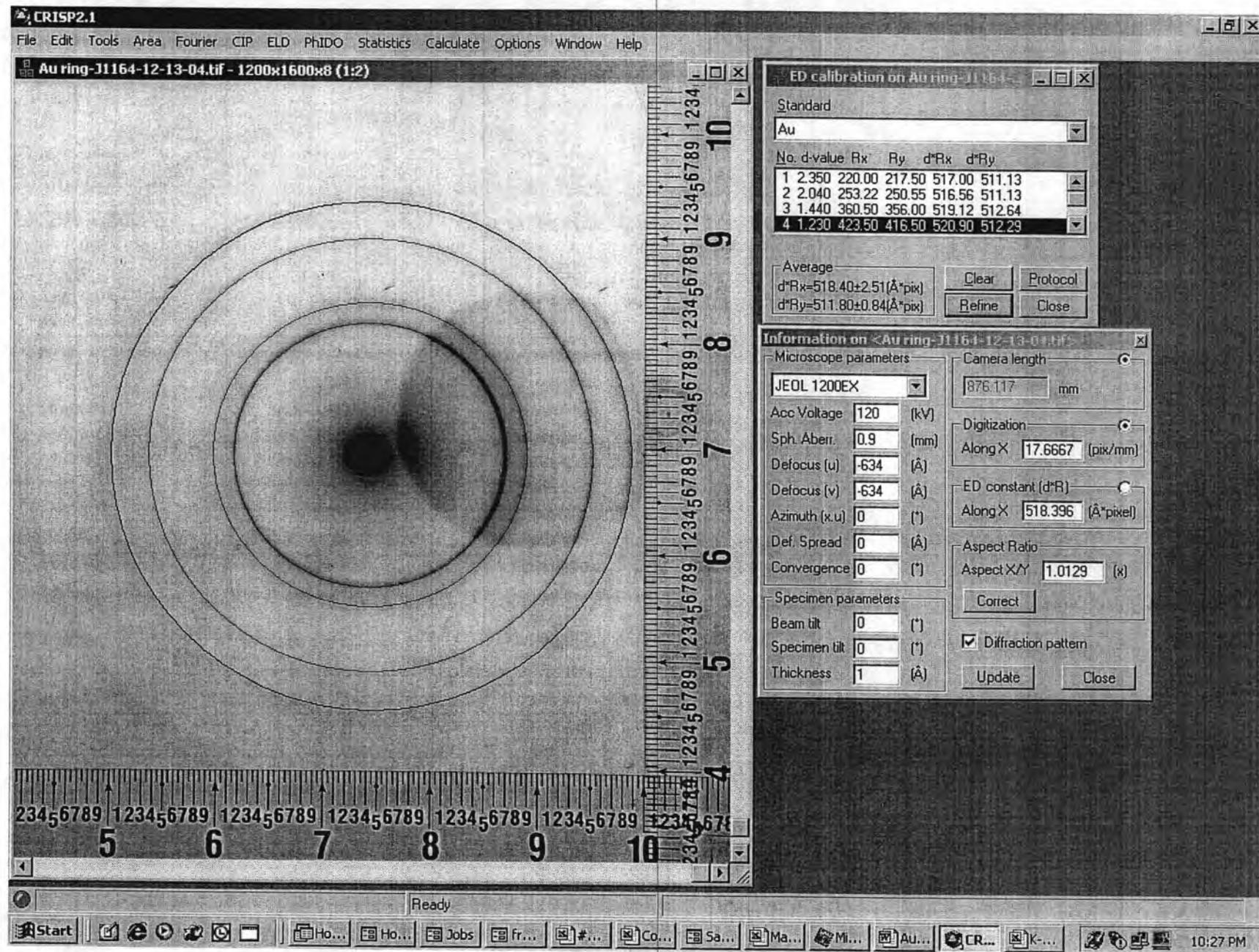
6.14 The determination of the quality of sample preparations is calibrated or the laboratory has the following documentation available:

- a. images and samples showing good preparations and examples of the types of problems that occur in poor preparations (readily available to analysts); and
- b. a record of repeat evaluations of images and samples by the same and different analysts. (This data may be derived in part from sample preparation evaluations done in the course of verified analysis.)

Au Std. 12/13/04

JEOL 1200EX

Neg J1164



Screen and Camera Magnification Calibration

Version#1

Date of Measurement: 12/17/2004

Analyst: DW

Average:

Screen Magnification at 18,000:	17347
Screen Magnification at 10,000:	10024

Camera Magnification at 18,000:	18133
Camera Magnification at 10,000:	10527
Camera Magnification at 550:	562

Setting 18,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
10/25/2004	5340	30.2	114.15	83.95	10	18133

H-5T
18,000

Screen

Date	# Spaces	Magnification
10/25/2004	19.3	17347

Setting 10,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
10/25/2004	5341	29.6	112.45	82.85	17	10527

H-5T
10527

Screen

Date	# Spaces	Magnification
10/25/2004	33.4	10024

Setting 550

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
10/25/2004	5342	48.25	61.25	13	50	562

H-5T
570

D₁ = The smaller measurement of the Supper Device in mm.

D₂ = The larger measurement of the Supper Device in mm.

D = D₂ - D₁

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Camera Magnification = (D/# spaces) * 2160

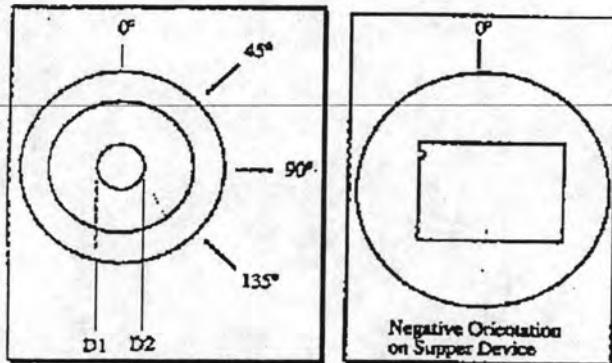
Screen Magnification = (155/# spaces) * 2160

Camera Length and Camera Constant Calibration (Version#1)

Date of Measurement:	12/17/2004	Average Camera Constant:	26.951 mmA
Negative Number:	5343	(All 12 Measurements)	
Date Negative was Taken:	10/25/2004	Average Camera Length:	728.42 mm
Analyst:	DW	(All 12 Measurements)	

Ring #	0 degrees						45 degrees					
	D ₁	D ₂	D	R	CC	CL	D ₁	D ₂	D	R	CC	CL
1	55.60	78.45	22.85	11.43	26.91	727.19	64.50	87.35	22.85	11.43	26.91	727.19
2	53.70	80.25	26.55	13.28	27.07	731.56	62.60	89.00	26.40	13.20	26.91	727.43
3	48.25	85.70	37.45	18.73	27.00	729.77	57.20	94.40	37.20	18.60	26.82	724.90

Ring #	90 degrees						135 degrees					
	D ₁	D ₂	D	R	CC	CL	D ₁	D ₂	D	R	CC	CL
1	76.65	99.55	22.90	11.45	26.96	728.78	85.15	108.05	22.90	11.45	26.96	728.78
2	74.85	101.35	26.50	13.25	27.02	730.18	83.25	109.80	26.55	13.28	27.07	731.56
3	69.55	106.80	37.25	18.63	26.86	725.87	77.80	115.15	37.35	18.68	26.93	727.82



Measure the first three rings moving outward from the central spot of the diffraction pattern.

D₁ = The smaller measurement on the Supper device (mm).

D₂ = The larger measurement on the Supper device (mm).

$$D = D_2 - D_1$$

$$R = D/2$$

CC = Camera Constant

For Ring 1 [111], CC = R*2.355

For Ring 2 [200], CC = R*2.039

For Ring 3 [220], CC = R*1.442

CL = Camera Length = CC/0.037

k-factor Calibration				
SRM 2063a (Revision# 4)				
Date:	12/17/2004			
Analyst:	JH			
Spectra Number	Mg	Si	Ca	Fe
1	1.88	1.00	1.00	1.27
2	1.93	1.00	1.00	1.29
3	1.88	1.00	0.99	1.28
4	1.89	1.00	0.99	1.28
5	1.88	1.00	0.99	1.28
Average	1.89	1.00	0.99	1.28
Standard Deviation	0.02	0.00	0.01	0.01
2s	0.05	0.00	0.01	0.01
STDEV Pass/Fail	Pass	Pass	Pass	Pass
Sensitivity (Mg:Fe)	1.48			
Pass/Fail	PASS			
Relative Limits	Mg		Ca	Fe
	Pass		Fail	Pass
Sensitivity (Mg:Fe) values greater than 1.5 are failed. Instrument must be taken out of operation, serviced and k-factor calibrations redone before instrument may be place back into service.				

SRM 2063a Raw data

Spectra Number		Mg	Si	Ca	Fe
1	Background				
	Net Area Counts	62.338	371.714	173.369	127.314
	Counts - Background	62.338	371.714	173.369	127.314
	Isi/la	5.96287978	1	2.144062664	2.91966319
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.88	1.00	1.00	1.27
2	Background	0	0	0	0
	Net Area Counts	40.504	248.989	116.193	84.248
	Counts - Background	40.504	248.989	116.193	84.248
	Isi/la	6.14726941	1	2.142891568	2.95542921
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.93	1.00	1.00	1.29
3	Background	0	0	0	0
	Net Area Counts	66.158	395.402	186.626	135.05
	Counts - Background	66.158	395.402	186.626	135.05
	Isi/la	5.9766317	1	2.118686571	2.92781933
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.88	1.00	0.99	1.28
4	Background	0	0	0	0
	Net Area Counts	59.319	357.172	167.774	121.903
	Counts - Background	59.319	357.172	167.774	121.903
	Isi/la	6.02120737	1	2.12888767	2.92996891
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.89	1.00	0.99	1.28
5	Background	0	0	0	0
	Net Area Counts	60.147	358.695	169.604	122.608
	Counts - Background	60.147	358.695	169.604	122.608
	Isi/la	5.96363908	1	2.114897054	2.92554319
	Ca/Csi	0.31452249	1	0.466456196	0.43646409
	k-factor	1.88	1.00	0.9865	1.28

Albite Standard Calibration			
SRM 99a (Revision# 3)			
Date:	12/17/2004		
Analyst:	TM		
Spectra Number	Na	Al	Si
1	2.04	1.53	1.00
2	2.05	1.45	1.00
3	2.14	1.37	1.00
4	2.45	1.46	1.00
5	2.18	1.49	1.00
Average	2.17	1.46	1.00
Standard Deviation	0.16	0.06	0.00
2s	0.33	0.11	0.00
STDEV Pass/Fail	Pass	Pass	Pass
Relative Limits	Na	Al	
	Pass	Pass	

SRM 99a Raw Data				
Spectra Number		Na	Al	Si
1	Background	15	49	158
15598	Gross Counts	151	734	2503
	Net Counts	136	685	2345
	Cx/Csi	0.118386243	0.445767196	1
	Isi/Ix	17.24264706	3.423357664	1
	k-factor	2.04	1.53	1.00
2	Background	49	119	529
15599	Gross Counts	483	2433	8043
	Net Counts	434	2314	7514
	Cx/Csi	0.118386243	0.445767196	1
	Isi/Ix	17.31336406	3.247191011	1
	k-factor	2.05	1.45	1.00
3	Background	25	46	237
15600	Gross Counts	165	867	2763
	Net Counts	140	821	2526
	Cx/Csi	0.118386243	0.445767196	1
	Isi/Ix	18.04285714	3.076735688	1
	k-factor	2.14	1.37	1.00
4	Background	42	98	534
15601	Gross Counts	405	2382	8033
	Net Counts	363	2284	7499
	Cx/Csi	0.118386243	0.445767196	1
	Isi/Ix	20.6584022	3.283274956	1
	k-factor	2.45	1.46	1.00
5	Background	36	89	348
15602	Gross Counts	289	1488	5012
	Net Counts	253	1399	4664
	Cx/Csi	0.118386243	0.445767196	1
	Isi/Ix	18.43478261	3.333809864	1
	k-factor	2.18	1.49	1.00

Screen Magnification Calibration (Philips 410)

(Version#1)

Date of Measurement: 12/17/04

Analyst: DW

Average:

Screen Magnification at 18,000:	17347
Screen Magnification at 10,000:	10024

Setting 18,000

Screen

Date	# Spaces	Magnification
10/25/2004	19.3	17347

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
10/25/2004	5.26	5.07

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
10/25/2004	0.53	0.51

Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
10/25/2004	4.61	4.44	0.058	0.576

Setting 10,000

Screen

Date	# Spaces	Magnification
10/25/2004	33.4	10024

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
10/25/2004	9.11	9.13

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
10/25/2004	0.91	0.913

Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
10/25/2004	7.98	8.00	0.100	0.998

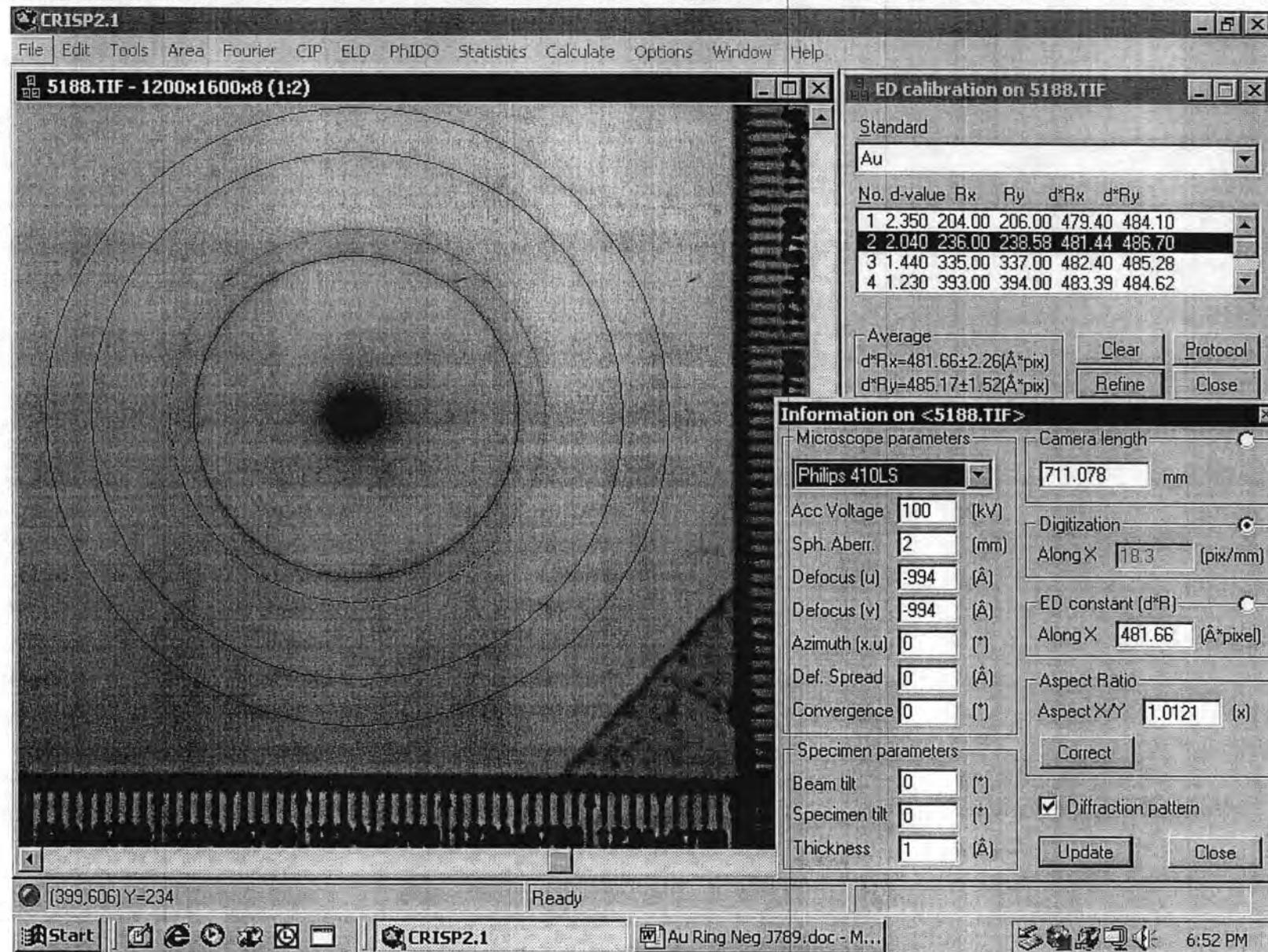
Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Screen Magnification = (155/# spaces) * 2160

Au Std 9/28/04

Philips 410

Neg 5188



Screen and Camera Magnification Calibration

Version#1

Date of Measurement: 12/17/2004

Analyst: KM

Average:

Screen Magnification at 18,000:	17187
Screen Magnification at 10,000:	9847

Camera Magnification at 18,000:	18036
Camera Magnification at 10,000:	10487
Camera Magnification at 550:	566

Setting 18,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/9/2004	5629	24	107.5	83.5	10	18036

11/5/04
18036

Screen

Date	# Spaces	Magnification
11/1/2004	19.48	17187

Setting 10,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/9/2004	5630	16.85	109.1	92.25	19	10487

11/5/04
10487

Screen

Date	# Spaces	Magnification
11/1/2004	34	9847

Setting 550

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
11/9/2004	5631	52.45	65.55	13.1	50	566

11/5/04
566

D₁ = The smaller measurement of the Supper Device in mm.

D₂ = The larger measurement of the Supper Device in mm.

D = D₂ - D₁

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Camera Magnification = (D/# spaces) * 2160

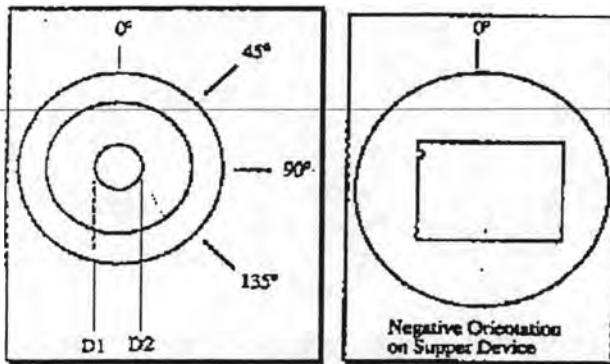
Screen Magnification = (155/# spaces) * 2160

Camera Length and Camera Constant Calibration (Version#1)

Date of Measurement:	12/17/2004	Average Camera Constant:	26.934 mmA
Negative Number:	5503	(All 12 Measurements)	
Date Negative was Taken:	11/16/2004	Average Camera Length:	727.95 mm
Analyst:	KM	(All 12 Measurements)	

Ring #	0 degrees						45 degrees					
	D ₁	D ₂	D	R	CC	CL	D ₁	D ₂	D	R	CC	CL
1	56.90	79.90	23.00	11.50	27.08	731.96	64.30	87.25	22.95	11.48	27.02	730.37
2	55.20	81.70	26.50	13.25	27.02	730.18	62.65	88.95	26.30	13.15	26.81	724.67
3	49.75	87.10	37.35	18.68	26.93	727.82	57.20	94.50	37.30	18.65	26.89	726.85

Ring #	90 degrees						135 degrees					
	D ₁	D ₂	D	R	CC	CL	D ₁	D ₂	D	R	CC	CL
1	75.30	98.20	22.90	11.45	26.96	728.78	83.15	106.00	22.85	11.43	26.91	727.19
2	73.45	99.80	26.35	13.18	26.86	726.05	81.35	107.80	26.45	13.23	26.97	728.80
3	68.05	105.30	37.25	18.63	26.86	725.87	75.75	113.05	37.30	18.65	26.89	726.85



Measure the first three rings moving outward from the central spot of the diffraction pattern.

D₁ = The smaller measurement on the Supper device (mm).

D₂ = The larger measurement on the Supper device (mm).

$$D = D_2 - D_1$$

$$R = D/2$$

CC = Camera Constant

For Ring 1 [111], CC = R*2.355

For Ring 2 [200], CC = R*2.039

For Ring 3 [220], CC = R*1.442

CL = Camera Length = CC/0.037

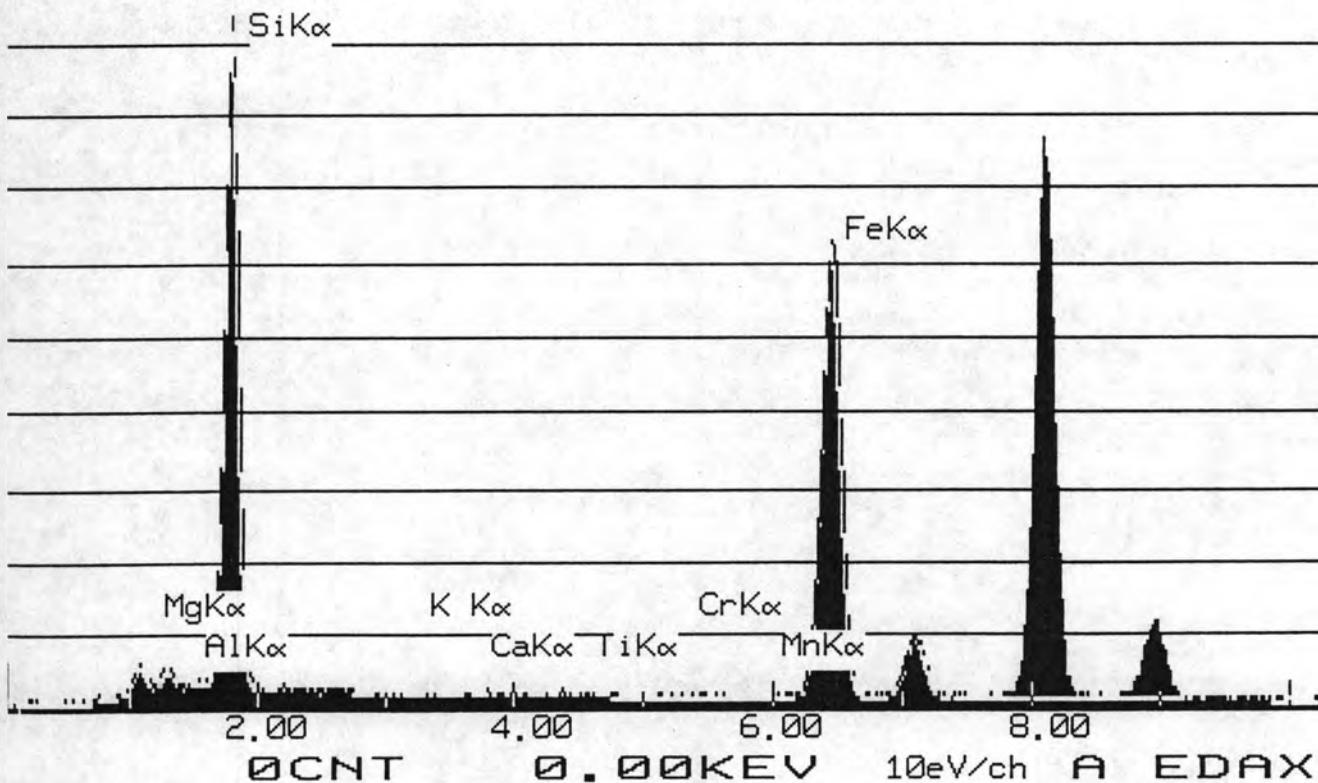
INTE-% :
LABEL = CROC STD 11/1/04 15277
JAN-73 19:53:55
91.138 LIVE SECONDS

ELEM	CPS	WT %	WT %
		ELEM	OXIDE
NAK	7.867	3.622	4.883
MGK	5.914	1.286	2.132
ALK	1.119	0.146	0.276
SIK	198.578	24.278	51.939
CRK	0.285	0.046	0.068
FEK	183.853	28.469	40.703

TOTAL		100.000	

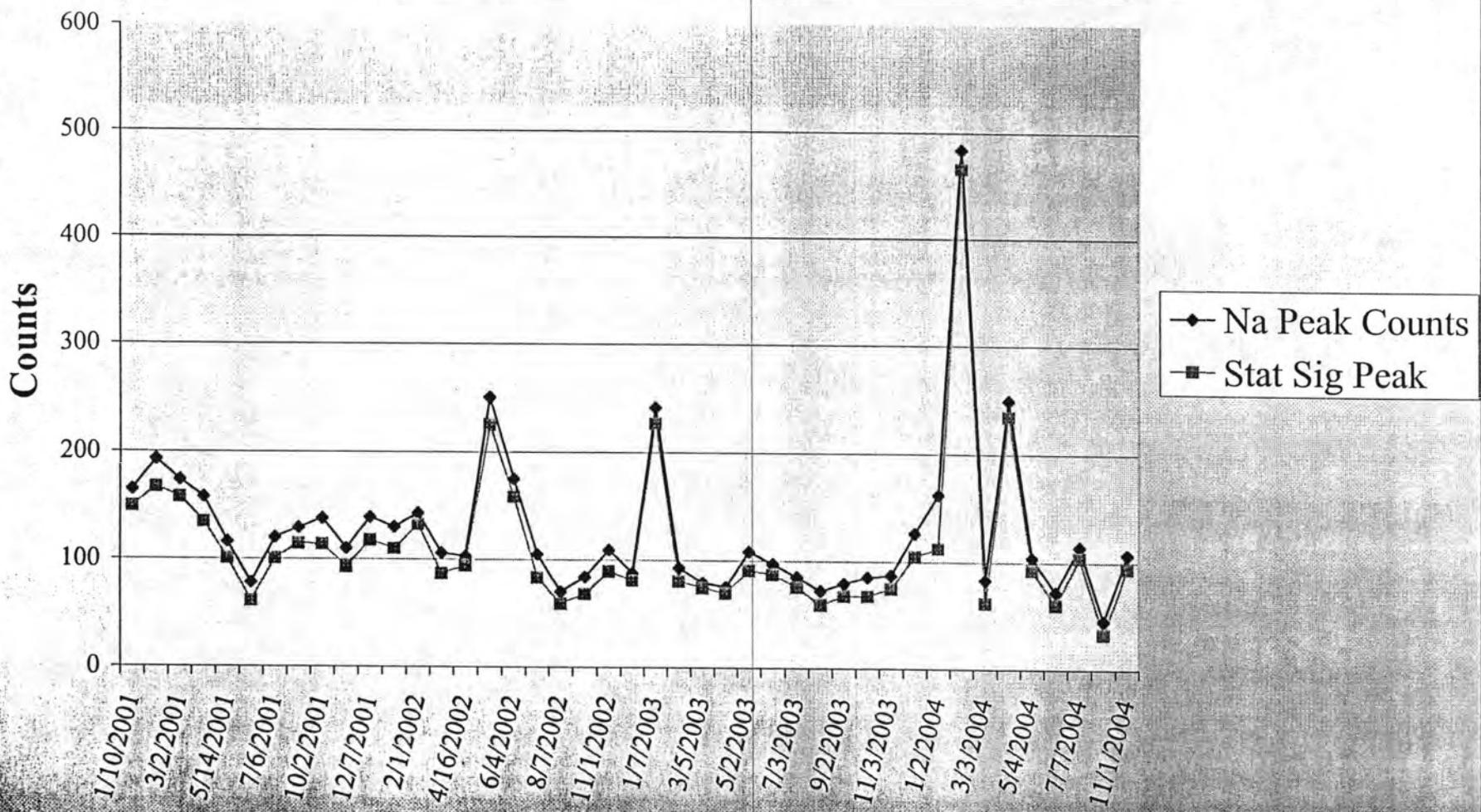
USED PEIF: USER

08-JAN-05 19:54:20 SUPER QUANT
RATE=21852CPS TIME= 91LSEC
FS= 1962/ 1962 PRST= 200LSEC
A =CROC STD 11/1/04 15277



Na Crocidolite Std Calibration

01/01 - 11/04



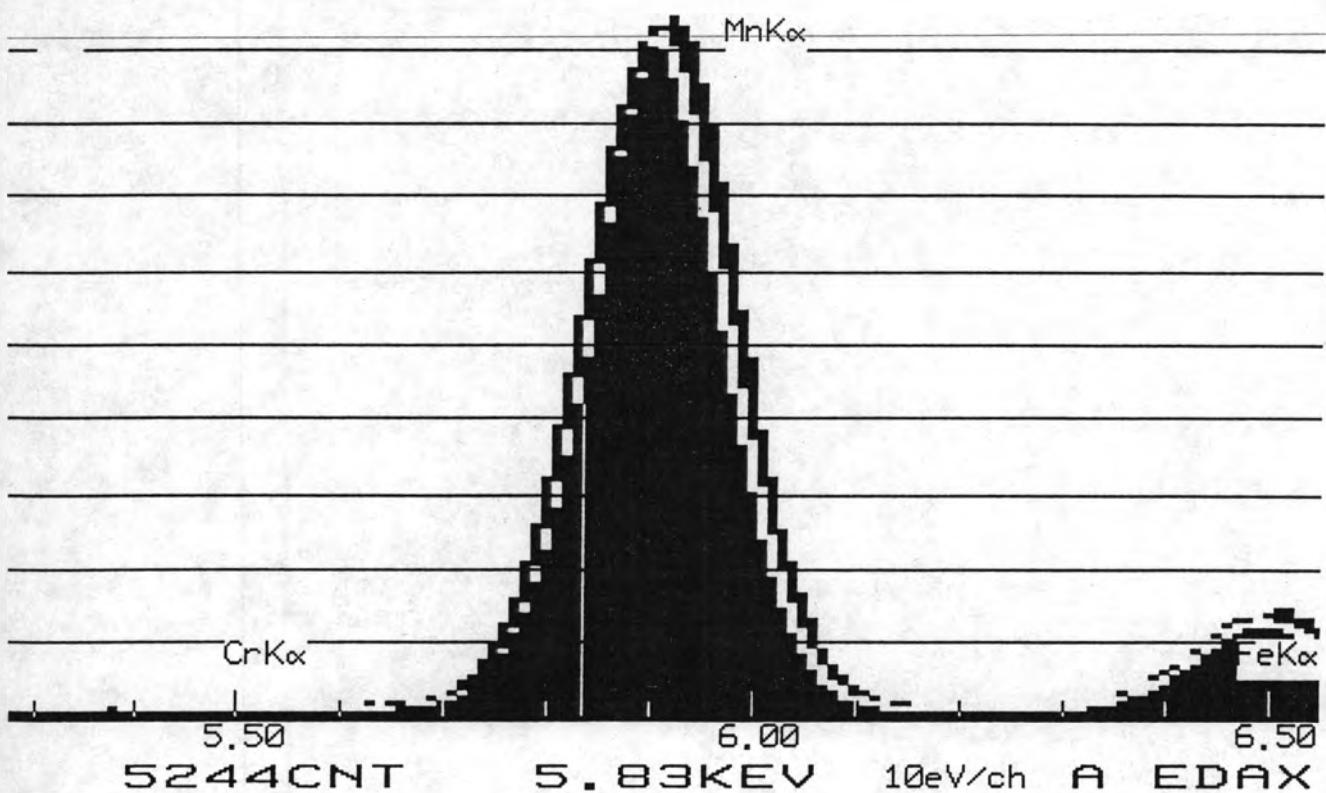
INTE-% :
J-BEL = MN STD 11/1/04 15278
C JAN-73 20:02:27
69.299 LIVE SECONDS

ELEM	CPS	WT %	WT %
		ELEM	OXIDE
NAK	0.534	0.056	0.076
ALK	0.866	0.026	0.049
SIK	0.303	0.008	0.018
MNK	2018.071	77.335	99.858

TOTAL		100.000	

USED PEIF: USER

08-JAN-05 20:02:52 SUPER QUANT
RATE=36068CPS TIME= 69LSEC
FS= 10892/ 10892 PRST= 200LSEC
A =MN STD 11/1/04 15278

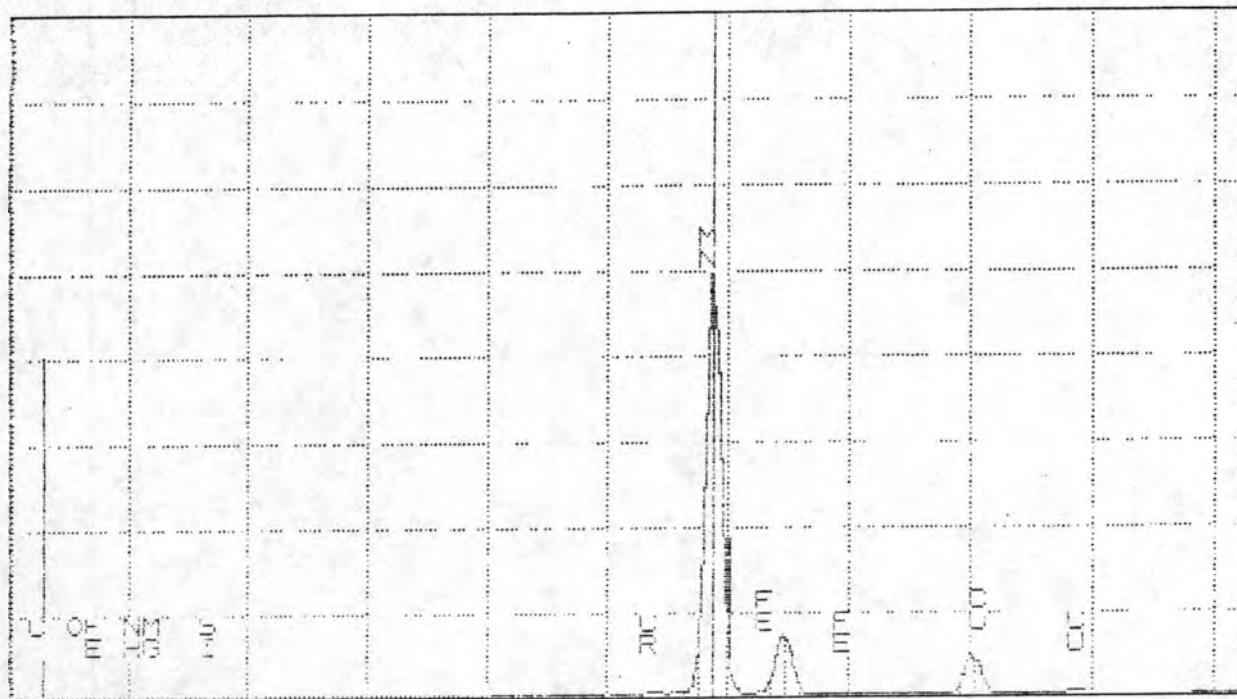


PHILIPS MnKa Peak Resolution Calibration

Date	Analyst	EDS	Mn Peak (cnts)	FWHM High (cnts)	FWHM Low (cnts)	FWHM (cnts)	# Channels	Resolution (eV)	Std Dev	Std Dev (2s)	Pass/Fail
2/5/02	DW		14255	7466	6369	6918	17	170			Pass
2/13/02	DW		10830	5441	4460	4951	17	170			Pass
2/26/02	DW		10070	5734	4772	5253	16	160			Pass
3/1/02	DW		10243	5177	4378	4778	15	150			Pass
3/20/02	DW		7684	3964	3290	3627	16	160			Pass
4/16/02	DW		10042	5693	4729	5211	16	160			Pass
5/2/02	DW	11466	10022	5310	4438	4874	17	170			Pass
6/4/02	DW	11531	10252	5421	4480	4951	16	160			Pass
7/1/02	DW	11800	10300	5749	4799	5274	16	160			Pass
8/7/02	DW	12318	10640	5905	4825	5365	17	170			Pass
10/1/02	DW	12634	15662	8414	7183	7799	17	170			Pass
11/1/02	DW	12667	20000	10797	9338	10068	17	170			Pass
12/2/02	DW	12778	10303	5421	4410	4916	16	160			Pass
1/7/03	DW	13007	10303	5569	4559	5064	14	140			Pass
2/7/03	KM	13089	10427	5960	4156	5058	17	170			Pass
3/5/2003	KM	13165	2348	1046	1279	1163	17	170			Pass
4/3/2003	KM	13226	10313	5676	4731	5204	16	160			Pass
5/5/2003	KM	13341	11454	5815	4977	5396	17	170			Pass
6/1/2003	KM	13437	9806	5385	4577	4981	17	170			Pass
7/3/2003	KM	13580	10335	5440	4620	5030	17	170			Pass
8/5/2003	KM	13713	10233	5686	4710	5198	17	170			Pass
9/2/2003	KM	13828	12311	6552	5661	6107	17	170			Pass
10/1/2003	KM	13981	10934	6341	5440	5891	17	170			Pass
11/3/2003	KM	14047	12783	7599	6376	6988	17	170	3.162	6.325	Pass
12/3/2003	KM	14131	10314	5258	4476	4867	17	170	3.162	6.325	Pass
1/2/2004	KM	14175	9901	5102	4166	4634	17	170	3.162	6.325	Pass
2/2/2004	KM	14240	10370	4747	5732	5240	17	170	0.000	0.000	Pass
3/3/2004	KM	14285	10232	5374	4428	4901	16	160	3.162	6.325	Pass
4/1/2004	KM	14371	9603	5532	4718	5125	17	170	3.162	6.325	Pass
5/4/2004	KM	14542	10344	4743	4017	4380	17	170	3.162	6.325	Pass
6/8/2004	KM	14819	10084	5420	4601	5011	17	170	3.162	6.325	Pass
7/7/2004	DW	14868	12292	5971	5843	5907	16	160	4.216	8.433	Pass
9/8/2004	KM	15032	6799	4180	3197	3689	16	160	4.830	9.661	Pass
11/1/2004	KM	15278	10251	6145	5244	5695	16	160	5.164	10.328	Pass

* Data is historical for the most recent 12 months

TN-5500 University of Washington / JEOL MON 01-NOV-04 17:25
 Cursor: S ENERGY = 101.49



0.000 C= 6 VFS = 15084 10.240
 82 1724chans 51%DT RT= 0sec 0.010KeV

CRUC STD 11/1/04 SP7 8/SECS
 CENTR. AREA FWHM
 288 154 63345 N
 590 365 144
 929 499 114
 4137 775 145
 5341 537 52 N
 5883 14045 142 - MN RESOLUTION
 6473 23545 149
 8624 15741 162
 8881 25499 174

JEOL Mn STD

11/1/04

TA FLUORINATED LUDWIG
SUMIF -38/80

SQMTE: QUANTIFY
Standardless Analysis

Refit K-K' K-K" CAK' CAK"
Refit MgK' ALK' K-K FEK"
Chi-sqrd = 4.99

JEOL CROCOSOLITE STD

Element	Net Counts
Si-K	8144 +/- 140
Mg-K	741 +/- 131
Al-K	360 +/- 164
K-K	0 +/- 0
Ca-K	122 +/- 30
Fe-K	6254 +/- 106
Na-K	1453 +/- 107

11/1/04

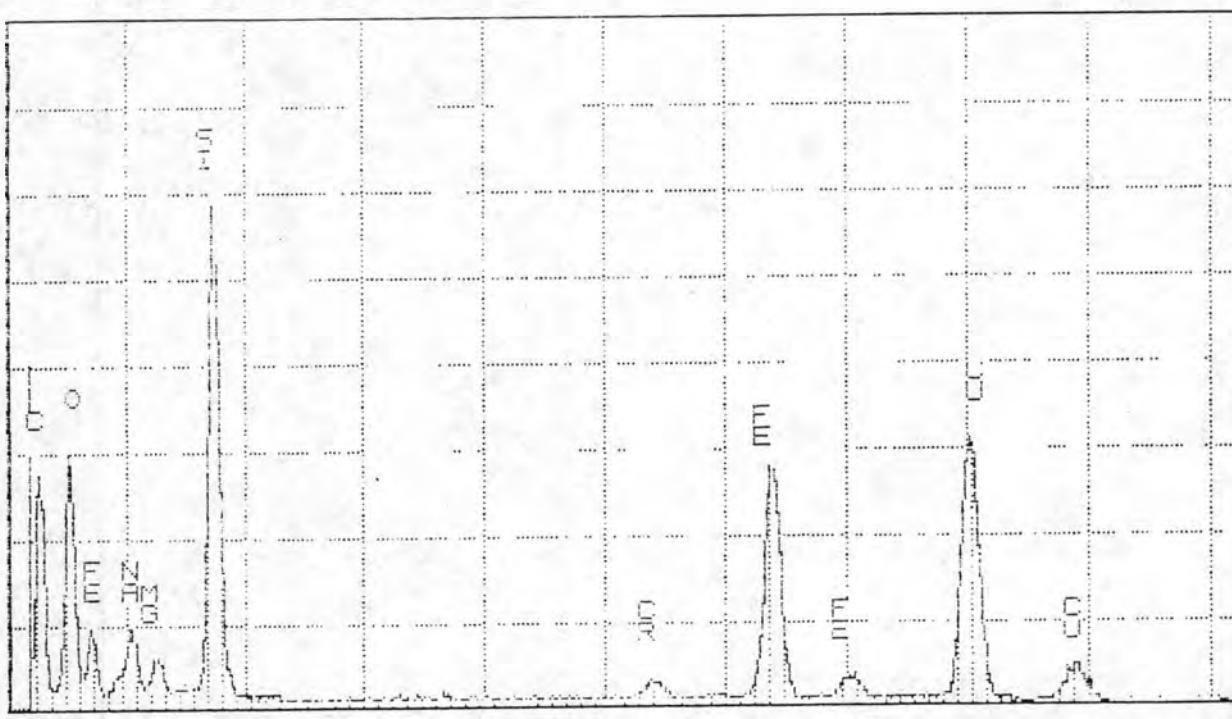
REF.S EDS:SiK EDS:MgK EDS:ALK EDS:K K EDS:CAK EDS:FEK
EDS:NAK

CROC STD 11/1/04 SP704

EL-LINE	PEAK	K-FACTOR	CEL/CREF	ATOM%	EL Wt%	WT%	FORMULA
Si-K	8144	1.000	1.000	20.16	24.31	52.09	SiO2
Mg-K	741	1.000	0.091	2.14	2.21	3.69	MgO
Al-K	360	0.750	0.033	0.67	0.81	1.52	AL2O3
K-K	0	1.060	0.000	0.00	0.00	0.00	K2O
Ca-K	122	0.949	0.014	0.20	0.35	0.48	CAO
FE-K	6254	1.399	1.075	10.84	12.13	37.34	FE2O3
NA-K	1453	0.549	0.098	2.41	2.39	4.88	NA2O3
			1.802	43.5A	44.40		

TN-5500 University of Washington / JEOL MON 01-NOV-04 17:16

Cursor: 0.00keV = 0



0 1000 8-5 VPS = 1024 10.24k

0 CROC STD 11/1/04 SP704

Lab/C, Inc.
A Professional Service Corporation in the Northwest

Report Number: 041373

Report Date: December 17, 2004

Client Information	
Project Name:	Test water bottles in Water Kit Supplies for asbestos
Project No.:	Not Available
P. O. No.:	Not Available
Sample Type:	Water

Tracking Information	
Login:	Nov 19, 2004
Prep:	Nov 19, 2004
Verified:	Nov 19, 2004
Reviewed:	Dec 17, 2004
By:	JS
By:	MH
By:	MH
By:	JH

Analysis Information	
Analysis Type:	EPA-Water
Reference No.:	100.2
Min. Aspect Ratio:	3:1
Min. Length:	10 µm
Min. Width:	Other µm

PRELIMINARY TABLE
Transmission Electron Microscopy – EPA-Water – Water Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concentration (MFL > 10 µm)**	95% Confidence Interval (MFL > 10 µm)	Struc. Count	Analytical Sens. (MFL > 10 µm)	Volume (ml)	Number of Grid Openings	Filter Area (mm ²)	Area Analyze d (mm ²)	Analyst	Analysis Date
041373-01	01	Water bottle certified as asbestos-free for Water Kit Supplies	AMPHIBOLE CHRYSOTILE	<0.083 <0.083	0 - 0.307 0 - 0.307	0 0	0.083	40.0	4	193	0.0580	MQ	12/17/04
			TOTAL	<0.083	0 - 0.307	0							

**MFL > 10µm – Million Fibers per Liter Greater Than 10 µm in Length. Samples with values higher than seven(7) MFL are above the EPA maximum contaminant level (MCL) and must be reported to the appropriate state agency for an assessment of vulnerability.

Screen Magnification Calibration (Philips 410)
 (Version#1)

Date of Measurement: 12/17/04

Analyst: DW

Average:

Screen Magnification at 18,000:	17187
Screen Magnification at 10,000:	9847

Setting 18,000

Screen

Date	# Spaces	Magnification
11/1/2004	19.48	17187

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
11/1/2004	5.31	5.07

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
11/1/2004	0.53	0.51

Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
11/1/2004	4.65	4.44	0.058	0.582

Setting 10,000

Screen

Date	# Spaces	Magnification
11/1/2004	34	9847

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
11/1/2004	9.27	9.13

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
11/1/2004	0.93	0.913

Rule

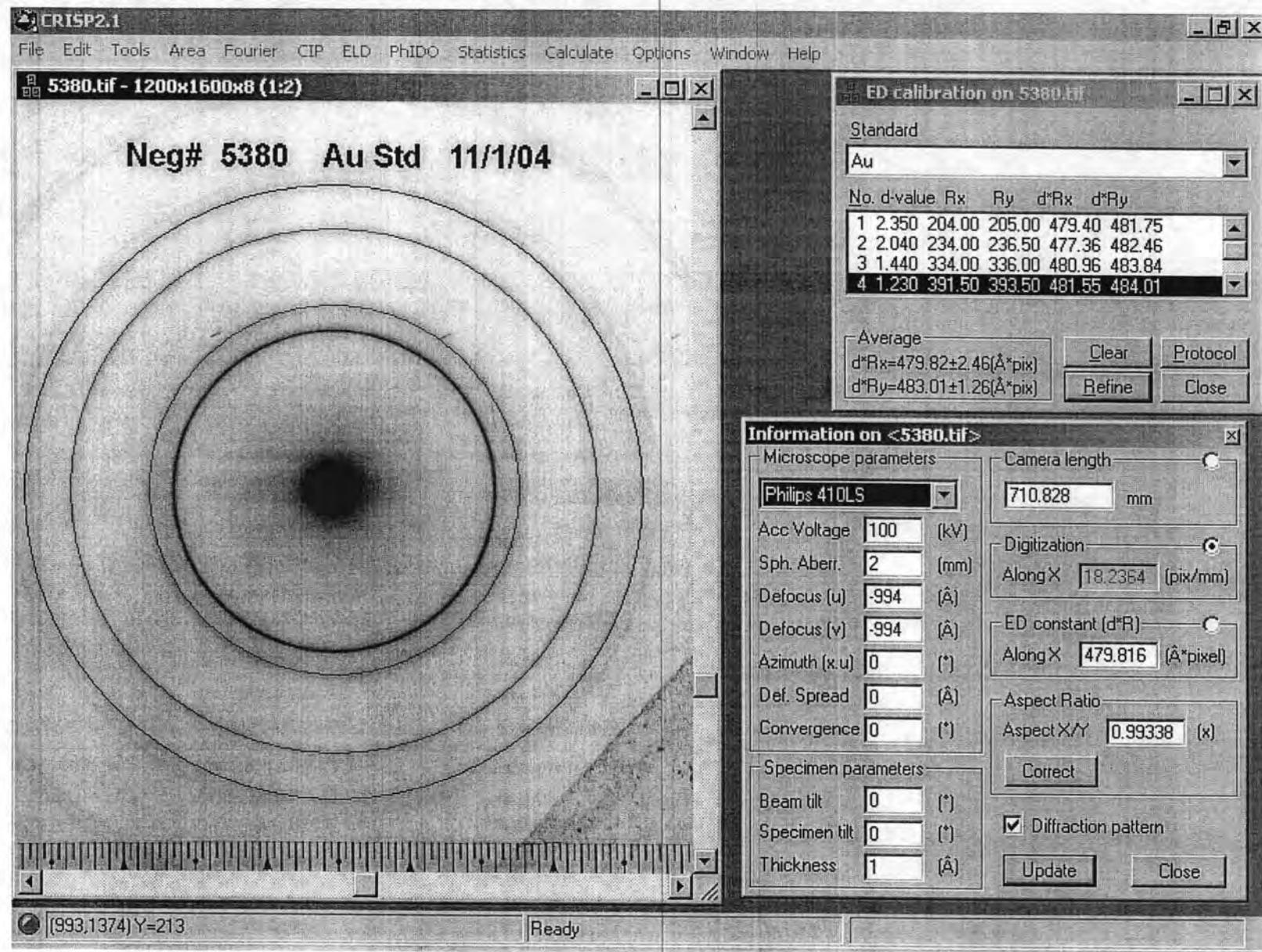
Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
11/1/2004	8.12	8.00	0.102	1.016

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Screen Magnification = (155/# spaces) * 2160

Au Std 11/1/04

Phillips 410



Montl

Calibration Log

Lab/Cor, Inc.

Date: Nov. 04

Screen and Camera Magnification Calibration

Version#1

Date of Measurement: 12/17/2004

Analyst: DW

Average:

Screen Magnification at 18,000:	17392
Screen Magnification at 10,000:	9648

Camera Magnification at 18,000:	18014
Camera Magnification at 10,000:	10482
Camera Magnification at 550:	557

Setting 18,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
12/15/2004	5718	26.6	110	83.4	10	18014

HIST
18096

Screen

Date	# Spaces	Magnification
12/15/2004	19.25	17392

Setting 10,000

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
12/15/2004	5719	23	105.5	82.5	17	10482

HIST
10511

Screen

Date	# Spaces	Magnification
12/15/2004	34.7	9648

Setting 550

Camera

Date	Negative #	D ₁	D ₂	D	# Spaces	Magnification
12/15/2004	5720	51	63.9	12.9	50	557

HIST
568

D₁ = The smaller measurement of the Supper Device in mm.

D₂ = The larger measurement of the Supper Device in mm.

D = D₂ - D₁

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Camera Magnification = (D/# spaces) * 2160

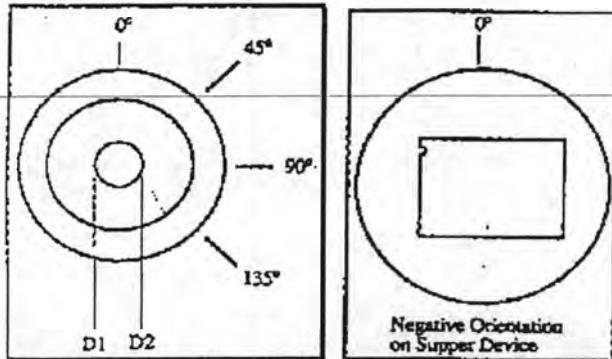
Screen Magnification = (155/# spaces) * 2160

Camera Length and Camera Constant Calibration (Version#1)

Date of Measurement:	12/17/2004	Average Camera Constant:	27.078 mmA
Negative Number:	5721	(All 12 Measurements)	
Date Negative was Taken:	12/15/2004	Average Camera Length:	731.83 mm
Analyst:	DW	(All 12 Measurements)	

Ring #	0 degrees						45 degrees					
	D ₁	D ₂	D	R	CC	CL	D ₁	D ₂	D	R	CC	CL
1	61.50	84.45	22.95	11.48	27.02	730.37	67.90	90.95	23.05	11.53	27.14	733.55
2	59.65	86.25	26.60	13.30	27.12	732.94	66.15	92.85	26.70	13.35	27.22	735.69
3	54.10	91.75	37.65	18.83	27.15	733.67	60.80	98.25	37.45	18.73	27.00	729.77

Ring #	90 degrees						135 degrees					
	D ₁	D ₂	D	R	CC	CL	D ₁	D ₂	D	R	CC	CL
1	75.80	98.80	23.00	11.50	27.08	731.96	80.25	103.25	23.00	11.50	27.08	731.96
2	73.90	100.50	26.60	13.30	27.12	732.94	78.45	105.00	26.55	13.28	27.07	731.56
3	68.60	106.00	37.40	18.70	26.97	728.79	73.00	110.40	37.40	18.70	26.97	728.79



Measure the first three rings moving outward from the central spot of the diffraction pattern.

D₁ = The smaller measurement on the Supper device (mm).

D₂ = The larger measurement on the Supper device (mm).

$$D = D_2 - D_1$$

$$R = D/2$$

CC = Camera Constant

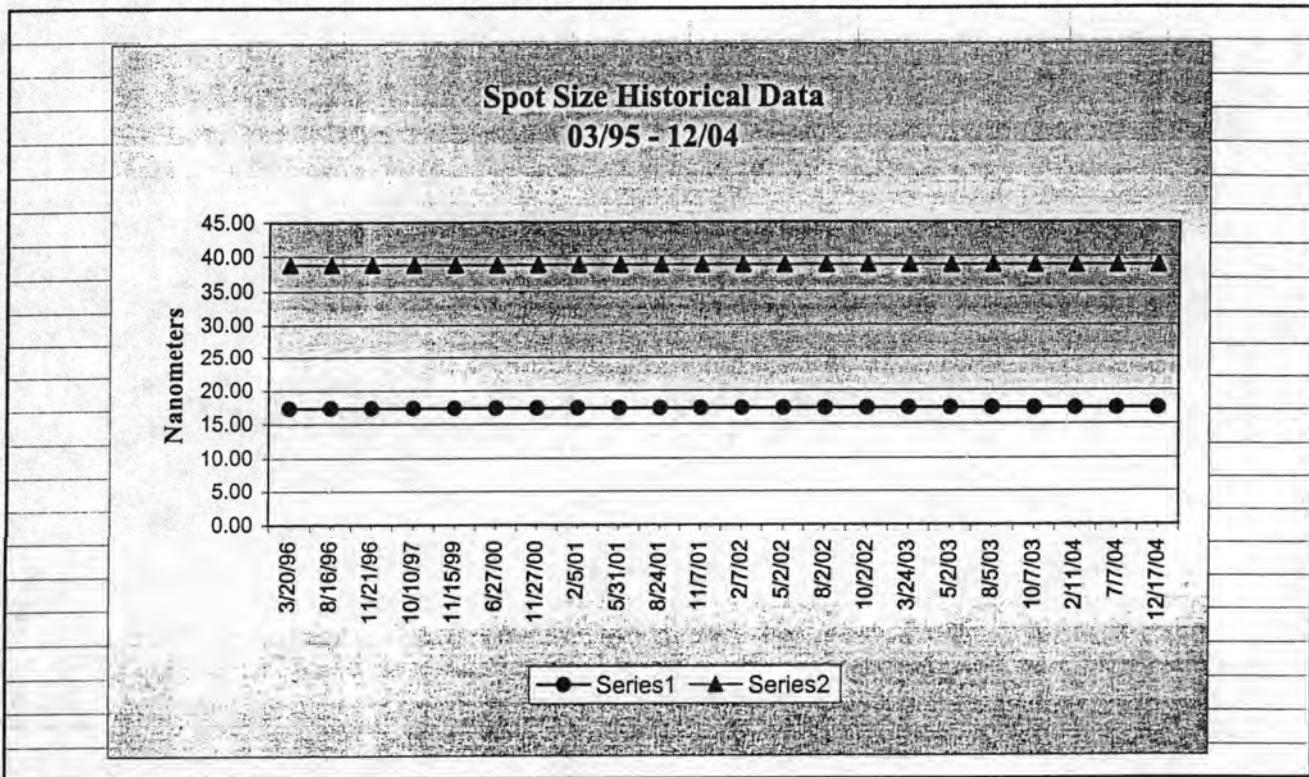
For Ring 1 [111], CC = R*2.355

For Ring 2 [200], CC = R*2.039

For Ring 3 [220], CC = R*1.442

CL = Camera Length = CC/0.037

Spot Size Calibration						
Spot Size Calculation						
Run #	Spot Size (mm)	Avg.SpotSize mm	CamMag	SpotSize nm	Historical Avg	
1	3.1	3.1	17392	176.3	155.1	
2	3.1					
3	3					
Date	Spot size (nm)	UpperLimit (nm)	Analyst	Negative #	STD Spot Size	2S
9/8/95	117	250	JH		154.88	17.36
3/20/95	150	250	JH		154.88	17.36
9/8/95	117	250	JH		154.88	17.36
3/20/96	150.36	250	JH		154.88	17.36
8/16/96	122.3	250	JH		154.88	17.36
11/21/96	122.37	250	JH		154.88	17.36
10/10/97	122.58	250	JH		154.88	17.36
11/15/99	102.2	250	GG		154.88	17.36
6/27/00	124.1	250	DW		154.88	17.36
11/27/00	153.3	250	DW		154.88	17.36
2/5/01	166.1	250	DW		154.88	17.36
5/31/01	129	250	DW	1149	154.88	17.36
8/24/01	173.9	250	DW	1481	154.88	17.36
11/7/01	167.4	250	DW	1725	154.88	17.36
2/7/02	138	250	DW	1991	154.88	17.36
5/2/02	168.8	250	DW	2213	154.88	17.36
8/2/02	155.6	250	DW	2247	154.88	17.36
10/2/02	155.6	250	DW	2561	154.88	17.36
3/24/03	139.7	250	DW	3009	154.88	17.36
5/2/03	122.4	250	DW	3160	154.88	17.36
8/5/03	135.9	250	KM	3590	154.88	17.36
10/7/03	165.7	250	DW	3881	154.88	17.36
2/11/04	171.7	250	KM	4241	154.88	17.36
7/7/04	161.4	250	KM	4965	154.88	17.36
12/17/04	176.3	250	MQ	5723	154.88	17.36



INTE-% :

-ABEL = MN STD 15566 12/15/04
6-DEC-72 04:03:57
81.354 LIVE SECONDS

MN STD 12/15/04

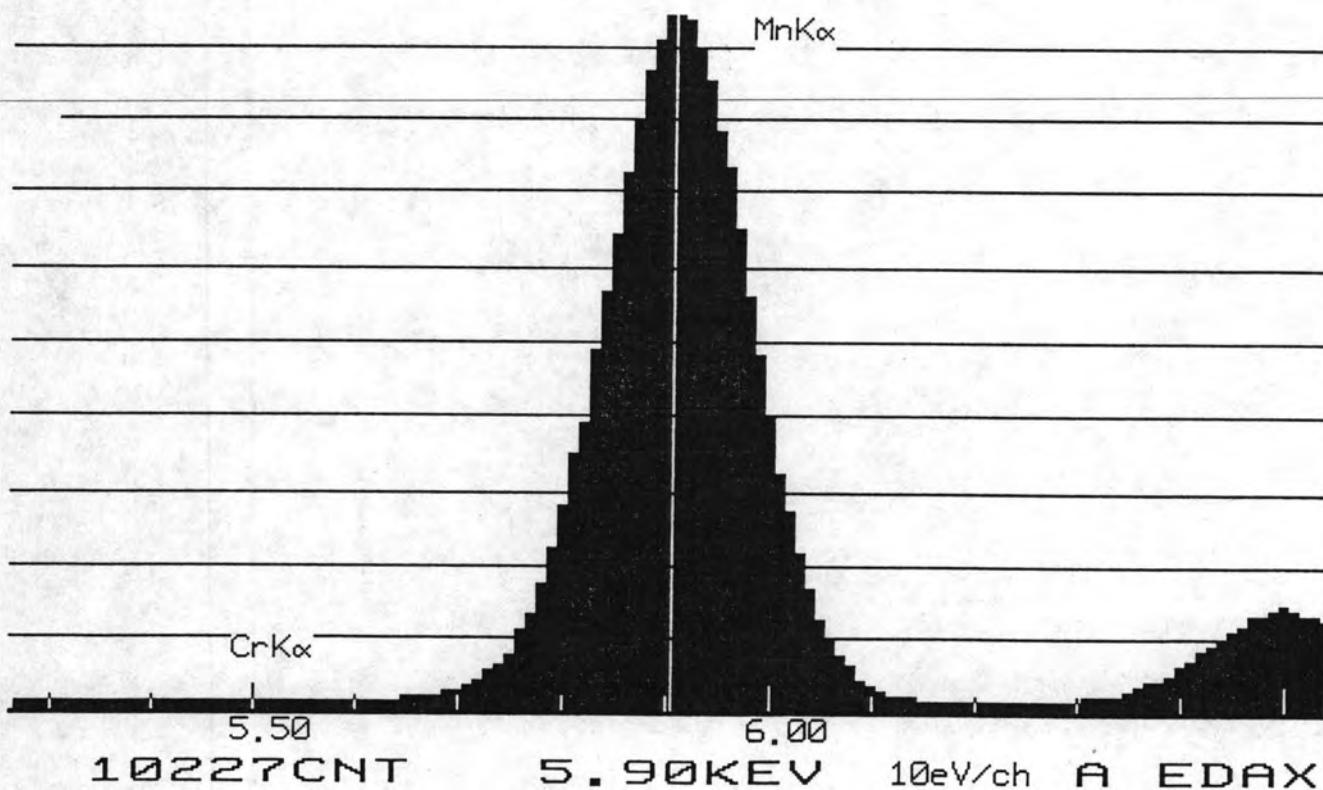
ELEM	CPS	WT %	ELEM	WT %
K K	0.393	0.022	OXIDE	0.026
MNK	1695.504	77.425		99.974

TOTAL		100.000		

12 channel @ 10eV/channel

USED PEIF: USER

15-DEC-04 04:04:15 SUPER QUANT
RATE=24143CPS TIME= 81LSEC
FS= 10903/ 10903 PRST= 200LSEC
A =MN STD 15566 12/15/04



PHILIPS MnKa Peak Resolution Calibration

Date	Analyst	EDS	Mn Peak (cents)	FWHM High (cents)	FWHM Low (cents)	FWHM (cents)	# Channels	Resolution (eV)	Std Dev	Std Dev (2s)	Pass/Fail
2/5/02	DW		14255	7466	6369	6918	17	170			Pass
2/13/02	DW		10830	5441	4460	4951	17	170			Pass
2/26/02	DW		10070	5734	4772	5253	16	160			Pass
3/1/02	DW		10243	5177	4378	4778	15	150			Pass
3/20/02	DW		7684	3964	3290	3627	16	160			Pass
4/16/02	DW		10042	5693	4729	5211	16	160			Pass
5/2/02	DW	11466	10022	5310	4438	4874	17	170			Pass
6/4/02	DW	11531	10252	5421	4480	4951	16	160			Pass
7/1/02	DW	11800	10300	5749	4799	5274	16	160			Pass
8/7/02	DW	12318	10640	5905	4825	5365	17	170			Pass
10/1/02	DW	12634	15662	8414	7183	7799	17	170			Pass
11/1/02	DW	12667	20000	10797	9338	10068	17	170			Pass
12/2/02	DW	12778	10303	5421	4410	4916	16	160			Pass
1/7/03	DW	13007	10303	5569	4559	5064	14	140			Pass
2/7/03	KM	13089	10427	5960	4156	5058	17	170			Pass
3/5/2003	KM	13165	2348	1046	1279	1163	17	170			Pass
4/3/2003	KM	13226	10313	5676	4731	5204	16	160			Pass
5/5/2003	KM	13341	11454	5815	4977	5396	17	170			Pass
6/1/2003	KM	13437	9806	5385	4577	4981	17	170			Pass
7/3/2003	KM	13580	10335	5440	4620	5030	17	170			Pass
8/5/2003	KM	13713	10233	5686	4710	5198	17	170			Pass
9/2/2003	KM	13828	12311	6552	5661	6107	17	170			Pass
10/1/2003	KM	13981	10934	6341	5440	5891	17	170			Pass
11/3/2003	KM	14047	12783	7599	6376	6988	17	170	3.162	6.325	Pass
12/3/2003	KM	14131	10314	5258	4476	4867	17	170	3.162	6.325	Pass
1/2/2004	KM	14175	9901	5102	4166	4634	17	170	3.162	6.325	Pass
2/2/2004	KM	14240	10370	4747	5732	5240	17	170	0.000	0.000	Pass
3/3/2004	KM	14285	10232	5374	4428	4901	16	160	3.162	6.325	Pass
4/1/2004	KM	14371	9603	5532	4718	5125	17	170	3.162	6.325	Pass
5/4/2004	KM	14542	10344	4743	4017	4380	17	170	3.162	6.325	Pass
6/8/2004	KM	14819	10084	5420	4601	5011	17	170	3.162	6.325	Pass
7/7/2004	DW	14868	12292	5971	5843	5907	16	160	4.216	8.433	Pass
9/8/2004	KM	15032	6799	4180	3197	3689	16	160	4.830	9.661	Pass
11/1/2004	KM	15278	10251	6145	5244	5695	16	160	4.924	9.847	Pass
12/15/2004	DW	15566	10227	5288	4330	4809	17	170	4.924	9.847	Pass

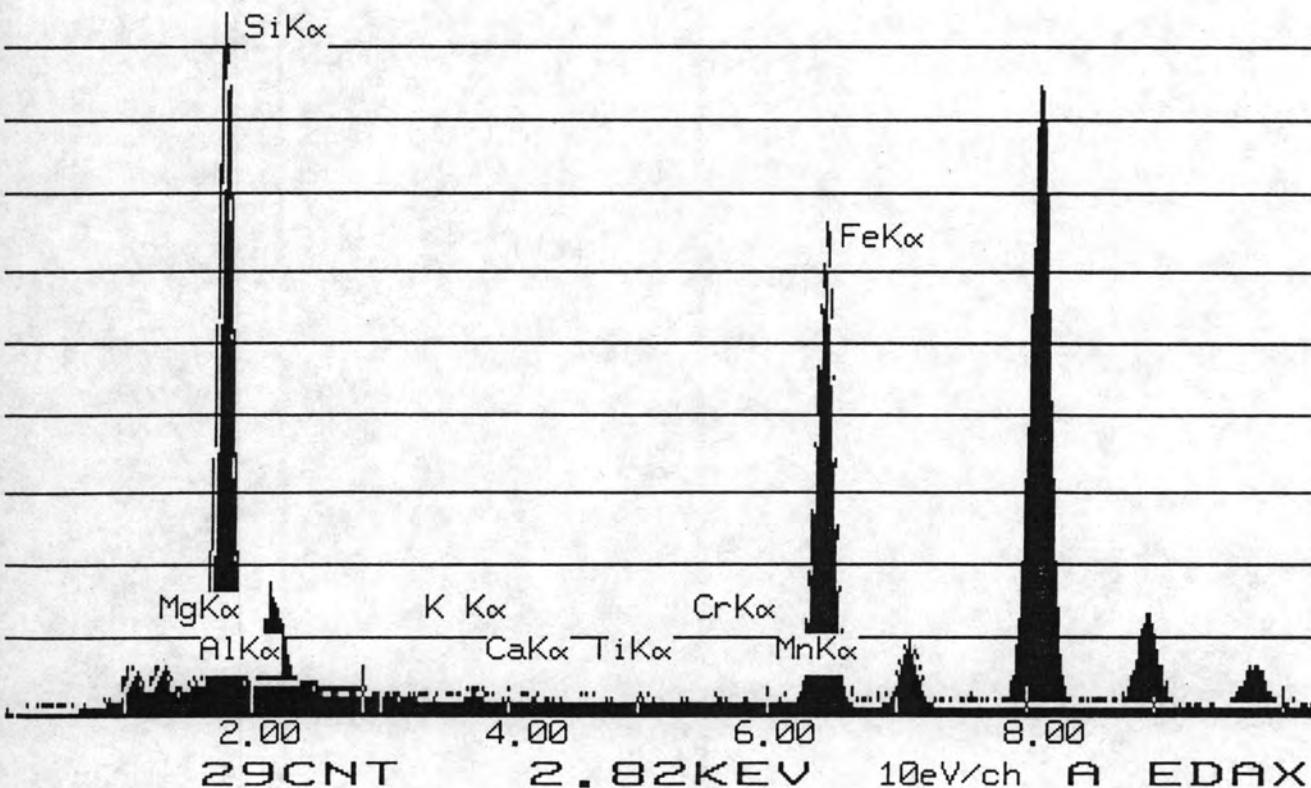
INTE-% :
L^ATEL = CROC STD 15568 12/15/04
1 DEC-72 05:10:28
64.025 LIVE SECONDS

ELEM	CPS	WT %	ELEM	WT %
NAK	7.291	2.885	OXIDE	3.888
MGK	9.512	1.777		2.946
ALK	2.421	0.272		0.513
SIK	230.814	24.248		51.875
CAK	3.983	0.399		0.558
MNK	0.734	0.106		0.137
FEK	210.697	28.035		40.082

TOTAL		100.000		

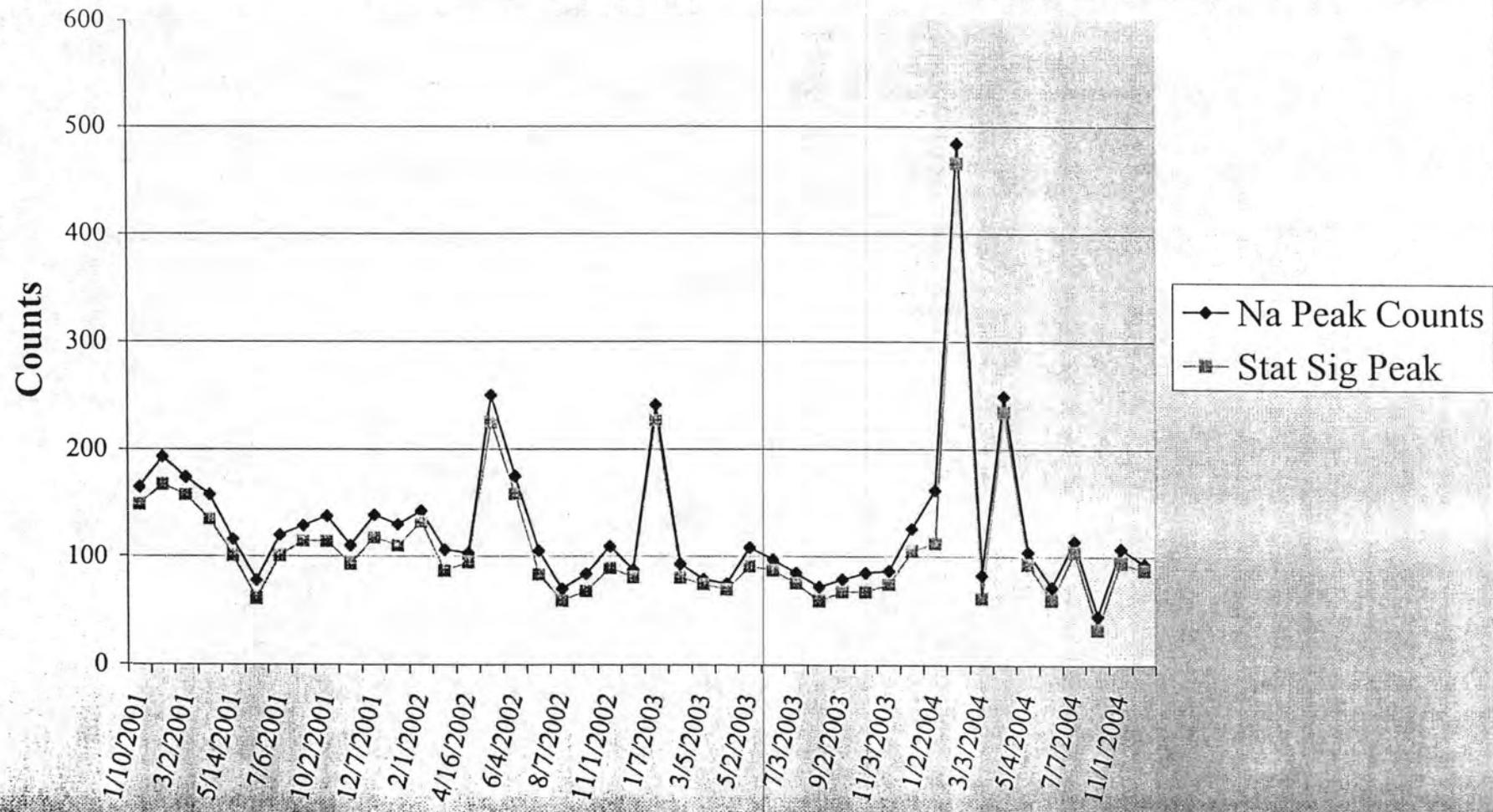
USED PEIF: USER

15-DEC-04 05:10:50 SUPER QUANT
RATE= 599CPS TIME= 64LSEC
FS= 1546/ 1546 PRST= 200LSEC
A =CROC STD 15568 12/15/04



Na Crocidolite Std Calibration

01/01 - 12/04



BEAM DOSE CALIBRATION				
(Version#1)				
Date:	12/15/04			
Analyst:	MQ			
Fiber Length used in analysis:		5 MICRONS		
Time (sec)	Visual	Neg #	Recordable Diffraction	EDS
0	Y	ND*	ND*	
30	Y	ND*	ND*	
60	Y	5725	Y	
90	Y	5726	Y	
120	Y	5727	Y	15567
PASS/FAIL	PASS		PASS	
*ND - Not Done				
Visual - Mark "Y" if diffraction pattern is seen on screen, mark "N" if pattern is not seen on screen				
Recordable Diffraction - Mark "Y" if diffraction pattern is seen on negative, mark "N" if pattern is not seen on negative				
Chrysotile Fiber Specs.: Single fibril, >= 1.0 micron in length				

Screen Magnification Calibration (Philips 410)
(Version#1)

Date of Measurement: 12/17/04

Analyst: DW

Average:

Screen Magnification at 18,000:	17258
Screen Magnification at 10,000:	9789

Setting 18,000

Screen

Date	# Spaces	Magnification
8/3/2004	19.4	17258

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
8/3/2004	5.29	5.07

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
8/3/2004	0.53	0.51

Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
8/3/2004	4.64	4.44	0.058	0.579

Setting 10,000

Screen

Date	# Spaces	Magnification
8/3/2004	34.2	9789

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
8/3/2004	9.33	9.13

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
8/3/2004	0.93	0.913

Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
8/3/2004	8.17	8.00	0.102	1.022

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Screen Magnification = (155/# spaces) * 2160

Screen Magnification Calibration (Philips 410)
 (Version#1)

Date of Measurement: 12/15/04

Analyst: KM

Average:

Screen Magnification at 18,000:	17392
Screen Magnification at 10,000:	9648

Setting 18,000

Screen

Date	# Spaces	Magnification
1/12/1900	19.25	17392

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
1/12/1900	5.25	5.07

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
1/12/1900	0.52	0.51

Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
1/12/1900	4.60	4.44	0.057	0.575

Setting 10,000

Screen

Date	# Spaces	Magnification
2/2/2004	34.7	9648

Large Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
2/2/2004	9.46	9.13

Small Circle Diameter

Date	Actual Diameter (um)	Theoretical Dia. (um)
2/2/2004	0.95	0.913

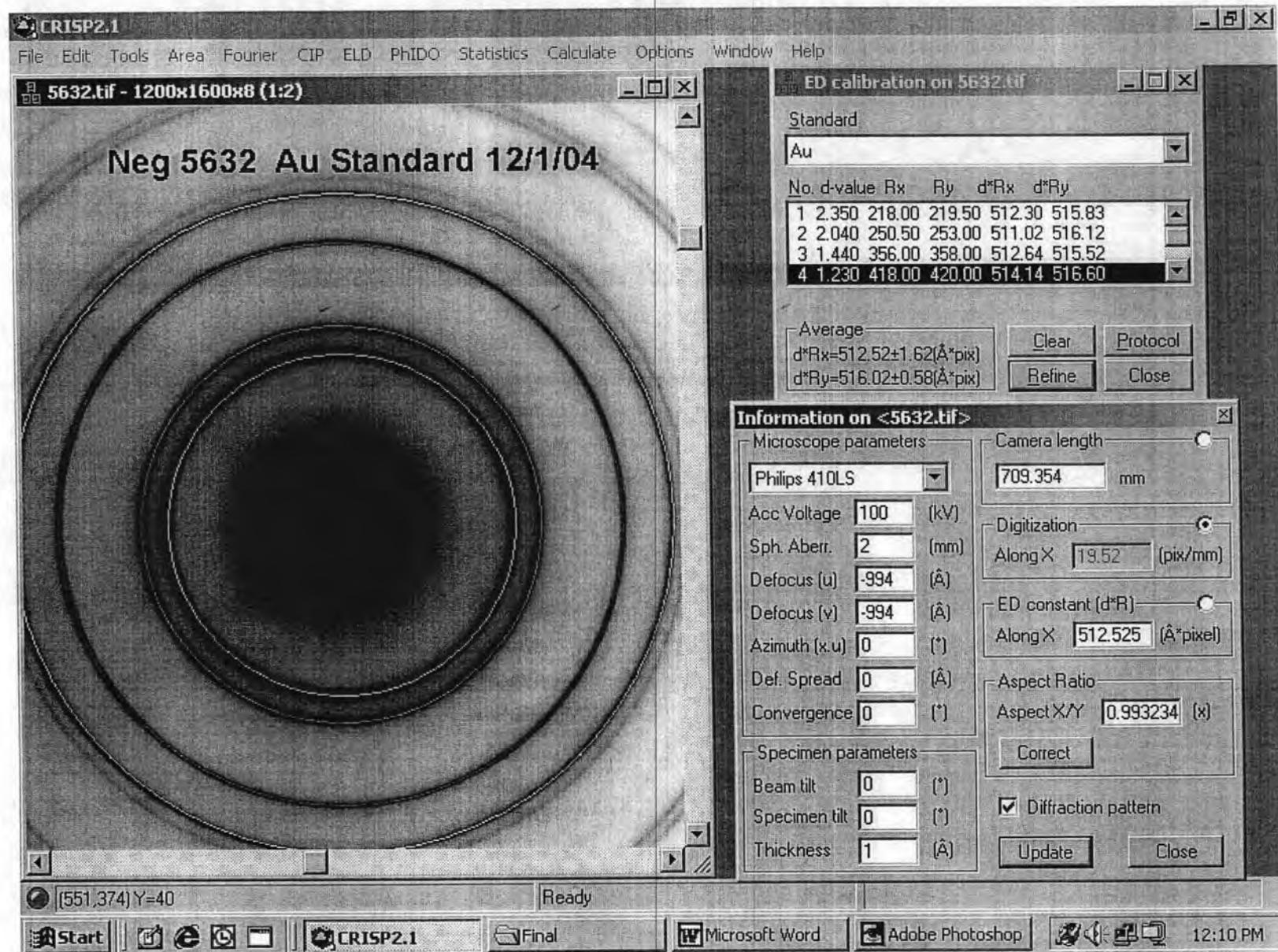
Rule

Date	Actual Length (um)	Theoretical Length (um)	Single Unit (um)	Ten Units (um)
2/2/2004	8.29	8.00	0.104	1.036

Spaces = The number of spaces spanned by the measurement or reported on calibration sheet. For the 18,000x screen mag., take the avg. of the five measurements recorded on the monthly calibration log. For the 10,000x screen mag., only one measurement is recorded on the monthly calibration log.

Screen Magnification = $(155/\# \text{ spaces}) * 2160$

Au Standard
Phillips 410LS
12/1/04



Montl Calibration Log

Lab/Cor, Inc.

Date: DEC 2004

Analyst	KM									TM					DW	
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
18K Mag. Calib. SC1	19.3														19.2	
SC2	19.2														19.2	
SC3	19.1														19.2	
SC4	19.4														17.2	
SC5	19.3														19.3	
10K Mag. Calibration	33.4														19.3	
EDS															33.7	
EDS Na																
EDS Al	1.0485									1.485					1.485	
Gain Inc.	-5									1					1	
New Gain	52									59					447	
Cu	8.044									8.044					8.044	
Zero Inc.	27									2					-15	
New Zero	-626									-456					-1451	
Resolution	164.3									158.4					168.9	
# of Iterations	60									2					3	
Alignment -- FCA	✓									✓					✓	
DA										✓					✓	
Gold Rings Negative	KM									KM					DW	
Camera Constant																
Analyst	KM															
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
18K Mag. Calib. SC1																
SC2																
SC3																
SC4																
SC5																
10K Mag. Calibration																
EDS																
EDS Na																
EDS Al																
Gain Inc.																
New Gain																
Cu																
Zero Inc.																
New Zero																
Resolution																
# of Iterations																
Alignment -- FCA	✓															
DA	✓															
Gold Rings Negative																
Camera Constant																